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Factory Report for 1952

The delay in the issuing of the Factory Report* is more extended than ever. Last year it was in our hands in April. Industry would appreciate reading about matters more up to date, rather than material dealing with occurrences which ended a year and a half ago. Sir George Barnett, H.M. Chief Inspector, again stresses the importance of reducing foot accidents in foundries. These arise through falling bodies and burns, and both can be seriously reduced by the wearing of safety boots, spats and leggings. There are two morbidly humorous events which have occurred in foundries, which illustrate the need for persistent propaganda to instil into the minds of the men the need for taking elementary precautions. One is included in the current Report and tells how a moulder having thrown the cope of a moulding box on the toe of a mate, was asked by his foreman to show him just how it happened. By way of demonstration he promptly threw another box-part—on to the foot of his foreman! The other, which we may have told earlier, was of a man who so liked his spats that he wore them for his journeys to and from the foundry, but removed them on arriving at work. There, he found to his sorrow that his sand shoes afforded but little protection from liquid metal splashes, and he became a casualty.

The statistics of foundry accidents for 1952 were, to say the least, unsatisfactory. There were 31 fatal and 11,232 non-fatal in that year, as compared with 29—12,482; 20—11,003; 24—10,740 and 22—11,033 from 1948 to 1951 respectively. It is obvious that mechanization and the increased tempo of working are major contributory factors and the modern foundry is quite different from its earlier counterpart. This change is illustrated by the gradual reduction of accidents from power-driven machinery. In five years there has been a decline from 1,503 to 1,337. The Report comments that the great efforts that have been made to popularize the use of protective clothing and goggles have not so far been encouraging. Another remark needing stressing is that "it may be safely taken as axiomatic that the nature of foundrywork demands the highest possible standards of tidiness and order." Eye accidents showed a 7 per cent. decrease as compared with 1951, and it is obvious that a further reduction could be had, if the operators in the fettling shops would but use the goggles provided.

Turning to industrial diseases, it is pleasing to learn there were no cases of lead poisoning amongst vitreous enamellers, whereas in 1910 there were 17 cases. The incidence of silicosis amongst "sand-blasters" was the lowest ever, one solitary case being reported. Under modern conditions, providing proper attention is given to maintenance, the hazard should be negligible, but strict compliance with the regulations is essential. There was an increase in the number of cases of this disease amongst grinders (14) and steel dressers (11), but the newer developments within the industry should now bring about some reduction. By and large, the adverse trends in foundry accidents are due in a large measure to the changing nature of the industry and, as the personnel become accustomed to the newer conditions, we hope and believe a lowered casualty rate will result, but—as the Chief Inspector himself points out—there must be constant propaganda.

* Annual Report of the Chief Inspector of Factories for the year 1952; published by H.M. Stationery Office, York House, Kingsway, London, W.C.2; price 6s. 6d. net.

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New I.B.F. Secretary

George Lambert, who has been appointed secretary of the Institute of British Foundrymen in succession to the late Mr. T. Makemson, has been assistant secretary of the Institute since 1947. Born at Newcastle-upon-Tyne in 1906, Mr. Lambert was educated in that city at the Central School of Commerce, where his studies included accountancy and economics. He received his early industrial training from 1922-27 in the purchasing and estimating departments of R. & W. Hawthorn, Leslie & Company, Limited's locomotive works at Newcastle-upon-Tyne. Following a short period of service with the Corporation of Gateshead-on-Tyne, he rejoined R. & W. Hawthorn, Leslie & Company, Limited, as personal secretary to the technical chief of the marine engine works at St. Peters-upon-Tyne. In 1931, he was appointed chief assistant to the secretary of the Institute of Marine Engineers, London, a post which he relinquished in 1947 to join the staff of the Institute of British Foundrymen.

In the latter capacity he has been responsible for the production of the Institute's *Proceedings* and for the work of the Technical Council and its sub-committees which has greatly expanded during the period of his service, and he has had a wide experience of conference work and of the general administration of the Institute.

The National Society of Master Patternmakers

The Society has prepared a statement which in clear terms sets out the origin and purpose of the Society; its office bearers; objectives; present programme, and benefits. It concludes with "Who may join" and "How to join." A separate document lists the founder members. It is an excellent straightforward statement of what has been done and what it is hoped to achieve in the future. These documents are available for all master patternmakers on writing to the secretaries, Mann Judd & Company, 8, Fredericks Place, Old Jewry, London, E.C.2.

Sub-Committee T.S.43 Chairman

Mr. E. S. Renshaw, chairman of sub-committee T.S.43 of the Institute of British Foundrymen, whose report appears in this issue of the JOURNAL, received his metallurgical training at the Sheffield University and works training at the Sheepbridge Coal & Iron Company, Limited, Chesterfield. He was then employed for three years as assistant metallurgist with the Sheepbridge Stokes Centrifugal Castings Company, Limited. In 1929, Mr. Renshaw joined Henry Ford & Son, Limited, Cork, Eire, as metallurgist and transferred to the Ford Motor Company, Limited, Dagenham, in 1932 and since that time has been foundry technical superintendent. He has visited the U.S.A. on a number of occasions and presented the official exchange paper of the I.B.F. to the American Foundrymen's Society in 1951. Mr. Renshaw was awarded a Diploma of the I.B.F. and the British Foundry Medal in 1951 and has served as a member of several technical sub-committees since joining the Institute in 1934. He is an associate of the Institution of Metallurgists.

Laboratory Furnishers' Merger

Griffin & Tatlock, Limited, and W. & J. George & Becker, Limited, in a joint statement issued on June 29, announce the merging of their two organizations under the name of Griffin & George, Limited.

Griffin & Tatlock, Limited, with their associated company, Standley Belcher & Mason, Limited, manufacture scientific apparatus and laboratory furniture in London and Birmingham, and have branch houses in Manchester, Sheffield, Glasgow and Edinburgh. Griffin & Tatlock (India), Limited, operates from Calcutta and Bombay. Their origin goes back to 1826.

W. & J. George & Becker, Limited, of London and Birmingham, have manufactured laboratory equipment since 1897. Their new offices and warehouse at Alperton, Middlesex, were completed in 1951. The original firm of F. E. Becker & Company was founded in 1872, and was purchased by W. & J. George, Limited, in 1897. Chairman of the new company is Mr. R. McKinnon Wood, O.B.E., M.A., F.R.AE.S., and vice-chairman Mr. H. R. Bettinson, M.C.

Production Exhibition and Conference

The "Production for Plenty" Exhibition, organized by the Institution of Production Engineers, was opened yesterday by Sir Walter Monckton, the Minister of Labour and National Service. It was exceedingly interesting and details of the principal exhibits associated with the foundry industry are given elsewhere in this issue. Worthy of special mention is the Ford exhibit which amongst other features shows a development of shell-moulding. This process is also shown by Bakelite, Limited, whilst a machine for making shell moulds was displayed by the Clyno Foundry Supplies, Limited. It is unfortunate that many of the Government department stands require more time for study than is at the disposal of the busy visitor.

New Singapore Foundry

Versatile Plant of United Engineers, Limited, Kampong Bahru

*By John Blakiston, M.I.Mech.E.**

United Engineers, Limited, came into existence in 1912 by the amalgamation of Howarth Erskine & Company, Limited, and Riley Hargreaves & Company, Limited, the participating concerns both having wide engineering connections covering South East Asia. On the formation of the company, the policy was to concentrate the company in the River Valley Road area of Singapore, whilst at the same time retaining branches in the adjacent countries and states. The original layout of the Singapore workshops was dictated by the growing demands made on the company by the tin and rubber industries which have been steadily increasing in importance. On the re-occupation of Singapore at the end of the second world war, a comprehensive scheme was put in hand to modernize and rehabilitate the shops to bring them into line with modern practice. Two main municipal roads dividing the works were taken over and the new construction was able to cover a continuous area. At the same time it was decided to remove the foundry from the River Valley Road site to a new site at Kampong Bahru, this foundry being brought into production on April 22, 1953. What follows is a description of this new plant, in many respects quite unorthodox by U.K. standards.

Terms of Reference

The terms of reference for the new foundry were for the plant to be of such a nature to cater for the fluctuating demands of the tin and rubber industries alike which require a wide range of casting sizes in grey iron, steel and non-ferrous materials. As well as this, the company incorporates into its activities a progressive business of dockyard facilities and slipways which at times calls for marine castings in the shortest possible delivery time. Apart from the large jobbing components in iron and steel, ranging up to 10 tons in individual weight (Fig. 1), castings were to be made on a semi-repetition batch-production system. Facilities had to be also incorporated for metal spinning and non-ferrous founding. The foundry was to be so constructed so as to change quickly on to any of the above types of work, or to be in a position to deal with the work intermixed. It had to incorporate modern developments of mechanization and production methods so far as were economic, and at the same time it had to be in keeping with modern building conceptions (Figs. 2 and 3) and labour amenities to conform with Singapore Municipal planning which has raised the standard of living of the Asian worker to a position which compares favourably with that of many European and American countries.

Production Capacity

The foundry was designed to have a maximum potential output of 100 tons of grey iron per week or alternatively 60 tons of steel castings, but, as such tonnages are only likely to be reached in exceptional circumstances, the scheme was based for the foundry to give an economical return at 50 per cent. of the above figures. In addition to the above, the non-ferrous section has a capacity of up to 10 tons per week, but, again, this is dependent on market fluctuations. The foundry was erected on a triangular site adjacent to Kampong Bahru Road, ideally situated for the various services. As Singapore is a crowded island, industrial land is scarce and the values are correspondingly high, therefore maximum ultilization of area has to be made.

Buildings

A general plan of the foundry is shown in Fig. 4; the buildings comprise an office and laboratory block (Fig. 5) and two main foundry bays which communicate with each other. The moulding and sand preparation is concentrated in a bay (Fig. 6) 66 ft. wide by 297 ft. long serviced by 5-ton overhead cranes. The pouring and heavy moulding as far as possible is accommodated in the adjacent bay (Fig. 7) 59 ft. wide by 204 ft. long. This bay is serviced by Vaughan overhead cranes having a maximum capacity of 15 tons. The converter plant, cupolas and non-ferrous melting units are concentrated in this bay, together with a knock-out, the idea being that fume- and dust-creating operations are better concentrated in the one area to facilitate the removal of dust, leaving the mould-production bays clear. The main buildings were constructed to give a height of 30 ft. to the crane gantries and incorporated roof louvres and side ventilation openings which have been instrumental in providing a clear and cool atmosphere under tropical conditions.

The fettling shop comprises a separate, reinforced-concrete building 227 ft. long by 40 ft. wide serviced by an overhead electric crane. A section of this building is allocated for power and compressed-air generation, while the top floor accommodates the patternshop and pattern stores. All the buildings have concrete floors, with clearly defined gangways and clear road access is maintained round various building sides so that every

* Engineering and foundry consultant.

FIG. 1.—*Cast-steel, main-bucket shaft and tumbler (weighing 9½ tons approx.) for a tin dredger; typical of the larger jobbing components made in United Engineers' foundry.*

department can take advantage of modern transport and material-handling methods. Great importance was attached to the accessibility of all portions of the works, and the production area sacrificed by the provision of adequate passageway has been more than compensated for by the advantage gained.

Laboratory

The various metallurgical processes operate under strict technical control emanating from a well equipped works laboratory. This laboratory is divided into three sections comprising a sand testing department situated in such a position as to give direct access to the sand plant; a well-equipped analytical laboratory (Fig. 8) with a corresponding balance room and, lastly, a physical-testing department, which is in a position to give outside service to companies and inspection-authority surveyors.

Melting Plant

The metal-melting plant comprises two 4½-tons-per-hour cupolas and one cupolette, which provide the metal for the grey-iron castings, or, alternatively, metal for the Tropenas converters. Two, 2-ton converters are situated in line with the cupola plant and are equipped for oxygen enrichment, so that when blown to capacity three "heats" from each converter can be collected into a common ladle, so giving sufficient metal for the teeming of a steel casting of up to 10 tons finished weight.

A direct-arc electric furnace of 2 tons capacity is to be transferred from the Ipoh works of the company and reinstalled in the end of the casting bay. This furnace will operate on the basic system in conjunction with the Tropenas plant. Non-ferrous melting takes place in a battery of oil-fired crucible furnaces, which link up with an oval-

FIG. 2.—*Flats for Asian workers, Singapore housing schemes.*

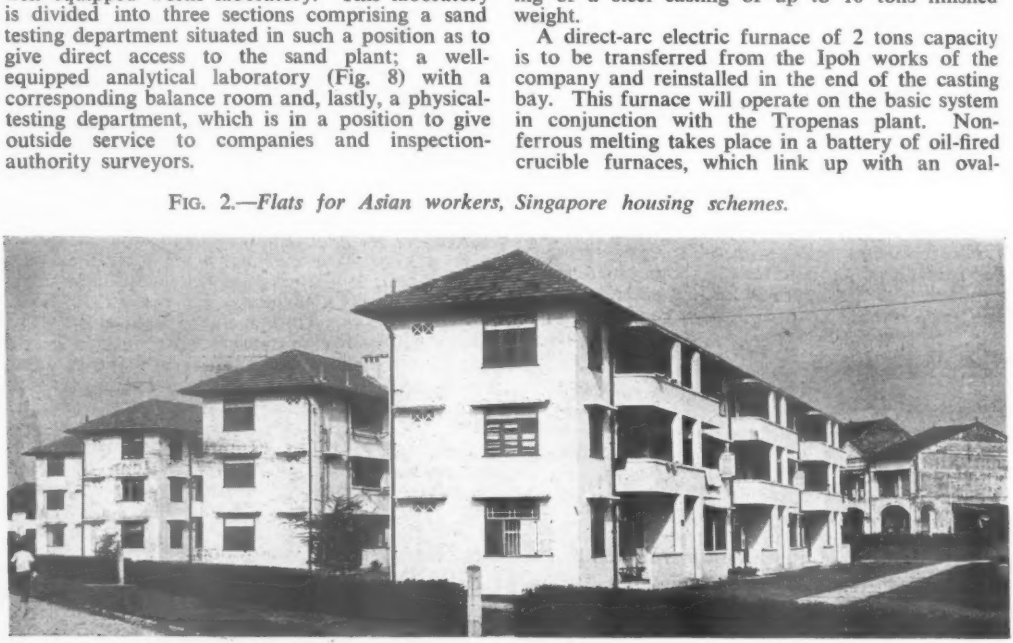


FIG. 3.—*One of the machine-shop bays of United Engineers, Limited; it occupies a portion of the site of the old foundry.*

loop overhead casting runway, which also caters for the grey-iron batch-production system. These crucible furnaces are also used for the preparation of alloy additions when steel castings are being made.

Stockyard and Internal Transport

Apart from the provision of an extremely versatile range of melting units, attention has been given to the cupola-charging system and stockyard handling. Drop-bottom charging buckets are used, which can be transported either singly or in train by battery-type towing units. These towing units are used throughout the foundry for distributing sand, moving mould-pallet bogies, pushing into or

FIG. 4.—*General plan of the foundry and ancillary buildings, showing the disposition of the main items of plant.*

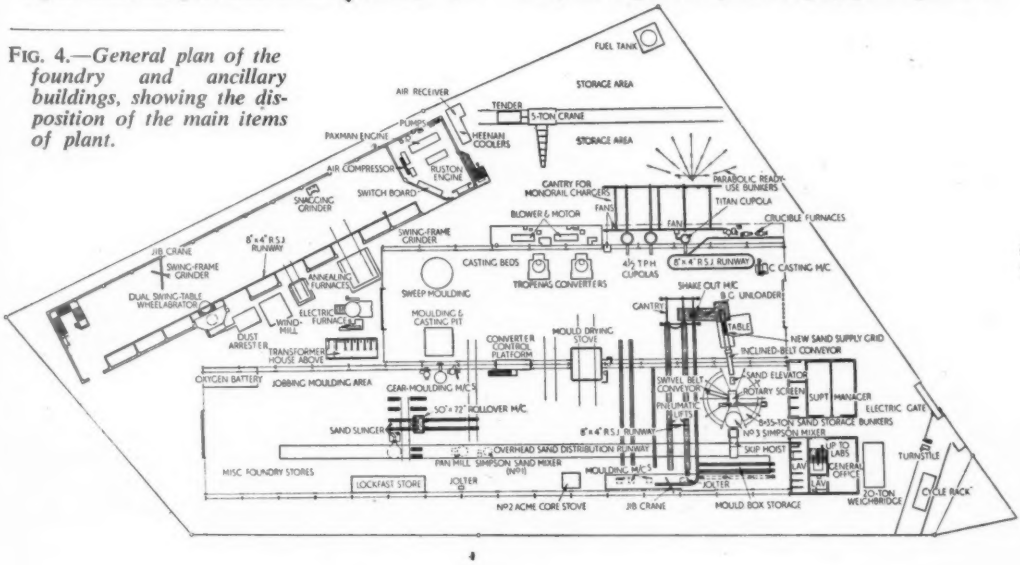


FIG. 5.—*External appearance of the office block, with the foundry buildings behind.*

drawing-out from the main drying stove, moving large mould bogies and a multiplicity of other uses.

Each cupola has a separately-operated bucket-type charging-hoist, as occasions arise when all melting units including the Tropenas converters have to be operating simultaneously. The unloading and stacking of the incoming raw materials is undertaken by a 5-ton travelling-jib crane, fitted with a magnet. This crane can discharge the metal into a semi-circle of parabolic bunkers which are arranged fan-wise to converge on a central charging hole situated immediately above a dial weighbridge. The charging skips are pulled in turn underneath this loading point and from thence are taken in sequence and positioned under the respective charging bays.

Slag Disposal

Singapore is dependent on imported coke which may come from Europe, Australia or India. In some cases, this coke has an extremely high ash content which, of course, produces a considerable volume of slag during cupola melting. The slag-disposal system has been designed to utilize receptacles into which are incorporated side slots. The slots coincide with the pitch of the fork of a Clark swivel-head vertical-lift truck (Fig. 12). These receptacles can be quickly placed into position and when full can be easily removed, the contents being tipped, after cooling, directly into motor wagons for disposal (Fig. 13). It will be seen from the illustration that this method of handling is adaptable for dealing with other materials in the foundry and fits neatly into the system of internal transport.

A scheme is in hand to convert the cupolas to water-cooling to effect economies in refractories and patching costs and also to enable the cupolas to prepare a basic iron.

Sand Plant

The design of the sand plant, to cater for the simultaneous preparation of sands with a wide range of properties, is considered to be of a unique design and comprises a circular nest of eight hoppers capable of holding in aggregate 400 tons of sand. These hoppers are erected in an elevated position round a centre post (Fig. 14). The sands for the different sections of the foundry, including new incoming sand, are segregated in the various hoppers which are fed from ground level by one belt-and-bucket elevator which feeds into a rotary screen, situated in a central position at the top of the hopper structure (Fig. 15). This screen is provided with a chimney which induces, if required, a cooling operation or natural-draught de-silting.

The sand discharged from this screen falls on to a short conveyor which can rotate over the full circle of hoppers thus discharging any sand delivered by the elevator into a selected hopper, which is numbered in a conspicuous manner. Two batch measurers (Fig. 16), cantilever supported from the centre post, can swing under the radius of any of the segmental sand-hopper doors. These batch measurers in their arc of travel can discharge directly into a No. 3 Simpson mill for batch mixing. The mill platform is accessible also to discharge from a fork-lift truck, so that sand additions and other materials are handled to their destinations with a minimum of manual effort. It will be seen from this arrangement that alternative batch mixing of sands can be prepared and kept completely separate so that in practice, if necessary, a complete sand change can be made with every mixing.

Sand Distribution

The prepared sand is discharged from the mill *via* a disintegrator into a vertical skip-hoist which discharges the sand into special containers for distribution to the various sand bunkers over moulding machines and moulding sections by means of an elevated gangway.

Each batch as mixed is thus kept separate to its ultimate destination. The sand containers are constructed with dual side/bottom discharge, and are moved along the overhead gangways by means of a battery truck retained especially for this purpose (Fig. 17). These units are guided along the gangways and round the loops by means of a centre retaining rail. Although it is necessary to have a man in attendance on this overhead gangway to drive the truck and to discharge the container, it was assumed that even if conveyors were used—at a considerably higher capital cost—it would still be necessary to have a man in attendance to work the ploughs and keep the sand hoppers clear, at the same time a conveyor system would not permit consecutive batch mixings of sand to be kept separate. Auxiliary No. 1 Simpson sand mills are installed underneath the overhead distribution gangway for the preparation of core-sand and small batch mixings of special facing sand.

FIG. 6.—(*top*) *Main moulding bay, 66 by 297 ft., and,* FIG. 7 (*bottom*), *pouring and jobbing moulding bay, 59 by 204 ft.*

FIG. 8.—*Portion of the chemical-analysis laboratory at United Engineers' foundry.*

Knock-out

The knock-out area is concentrated in the main casting bay in the vicinity of the base of the main sand-plant elevator. A large common knock-out platform is located at one side of an initial connecting conveyor to the elevator, and over the latter is fitted a magnetic separator. Large box-parts are knocked out in this area and it is also utilized for the reception of new sand, which is passed to storage through the knock-out system. Motor lorries containing the sand, or internal mobile shop transport, can be brought direct to this point, which is also covered by the cranes serving the main casting bay.

At the other side of the knock-out area, to deal with the smaller moulds and the semi-repetition work from the batch production section, a mechanical vibratory knock-out grid unit (Fig. 18) is incorporated, underneath an auxiliary overhead gantry used for quickly lifting the small boxes to this knock-out station by means of Roper hoists. This station can also handle trains of moulds brought into the area, after casting, by means of a battery truck. On account of water-logged ground conditions, all excavations have been kept to a minimum and to facilitate this, the discharge from the vibratory knock-out to the inclined knock-out-sand conveyor, is handled by a Barber-Greene loader.

Moulding Sections

The moulding is divided into three sections in addition to the area allocated for non-ferrous production and centrifugal casting—the latter being carried out by the horizontal Janco system, driven by an electric variable-speed-controlled motor. With this plant, it is possible to make liners in various materials or to undertake spun pipe manufacture in limited lengths and quantities.

Batch production

At times, a demand arises for castings in such numbers which warrant semi-mechanized batch production, and to cater for this, a group of moulding machines, comprising of Osborne jolt-turnover machines and a Gibson-Battle straight-draw moulding machine, have been installed in the vicinity of the main sand plant, so that if necessary an amount of semi-continuous production can be maintained. The moulding machines, which have hopper sand-feed from the main sand system, discharge on to lengths of roller conveyor, the moulds

FIG. 9.—*Melting plant, showing (left) one of the converters and (top, centre) the cupolas and cupolette.*

FIG. 10. — *Cupola-charging plant and (left) stockyard with its fan-type materials ramp served by magnet from the travelling jib crane.*

passing under a closing station, which is thought unique insofar as the closing takes place by the raising of the bottom part to the stationary top part by means of a pneumatic piston and ram. After closing, the lifting bridle of the top box is disengaged and the complete mould is allowed to lower itself to the conveyor level. This method of operation has been found to give steady, controlled closing with a minimum of headroom.

The moulds pass along the roller conveyor into the casting bay and after pouring are knocked-out in a manner previously described. If necessary this system can alternate with or be augmented by the utilization of a train of bogies and a towing unit (Fig. 20), taking the moulds direct from the closing point to the casting area and subsequently to the knock-out.

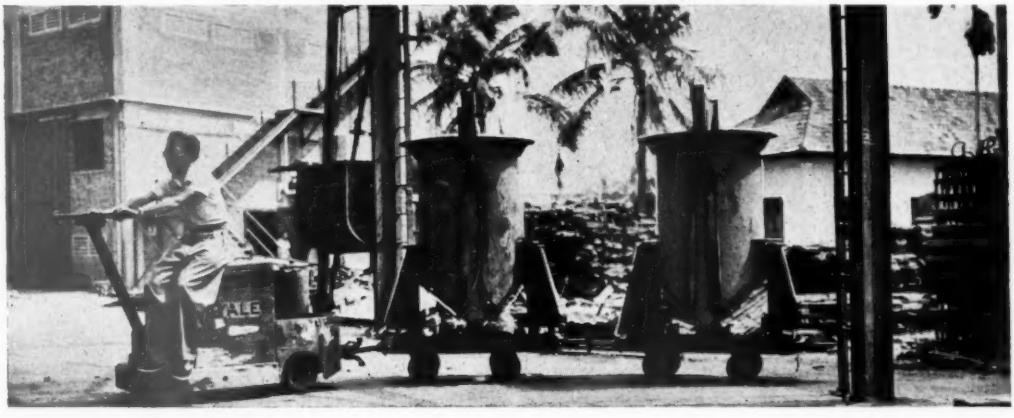
Medium-size moulding

A considerable area is allocated for this type of work, which, apart from being for either iron or steel castings may have to be undertaken by either green-sand or dry-sand, or even in some cases, by the adoption of the cement-sand system. The area is catered for by the overhead sand-distribution gangway and is adjacent to the core-making section. Where possible, the components to be manufactured are set up for manipulation at a combined station comprising an impeller-rammer and a 4,000-lb. Herman rollover machine (Fig. 21). This production station is so laid out that repeated or consecutive pattern changes can be made without any appreciable loss of production time. While this area is normally covered by the overhead crane, use can be made of the Clark fork-lift truck for the unloading or the movement of moulds.

Heavy moulding

As stated, the conception of the buildings called for concrete floors to facilitate transport, but a limited number of pits are incorporated in clearly defined areas for the manufacture of some of the larger components. These pits are kept shallow on account of ground conditions and are continuously drained to a sump, in which is incorporated a pump, continuously operated by a windmill located above the foundry roof. Full advantage is taken of the generous headroom in the foundry

FIG. 11.—*Charging skips and one of the battery-operated towing bogies. [The "feathery" objects in the background are palm trees*—ED.]



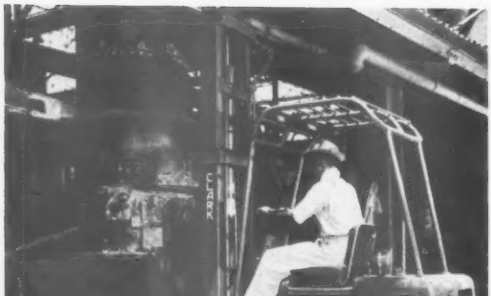


FIG. 12.—*(above) Clark, vertical, fork-lift truck and cupola-slag container, and* FIG. 13.—*Disposal of the slag from the container into road wagon.*

and much of the moulds for large work is built above ground level.

Large, circular mould-retaining walls are built up by means of plates linked together by pins (Fig. 22), the overall diameter being varied by the insertion or the removal of additional link plates. An added advantage of this system is that it is possible quickly to dismantle and remove the box unit when not required.

A continuous demand exists for cast gearing in different forms, and to cater for this a battery of

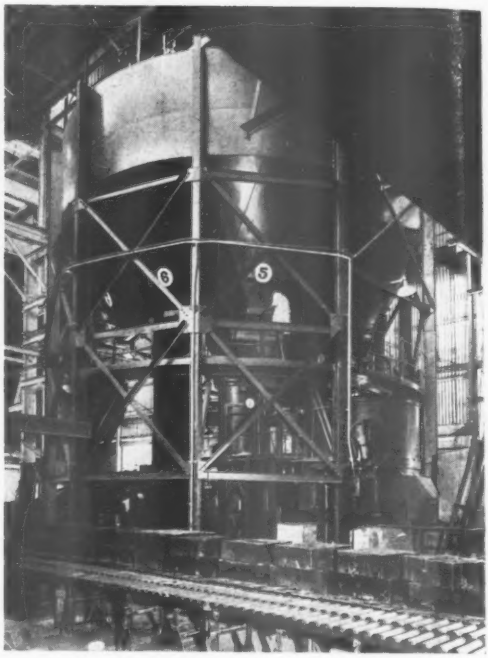


FIG. 14.—*Circular nest of eight segmental sand hoppers, aggregate capacity* 400 *tons, with the Simpson-type mill below (bottom-right).*

wheel-moulding machines is installed. Two of these are shown in Fig. 23.

Coremaking and Mould Drying

Small cores are made in an area at the side of the main moulding bay, on benches which are situated in the vicinity of an Acme vertical drying stove, the core sand being conveyed to the operators by means of small shovel-out hoppers mounted on bogies (Fig. 24). When the numbers and sequence of cores warrant it, portable roller conveyor is used for their transportation. Larger cores are made in the main moulding bay and are dried in a large, oil-fired, double-ended stove, which communicates between the main moulding bay and the main casting bay, the cores being passed through the far end of stove (after drying) from the moulding bay to the casting bay. In the same way, the moulds are fed through for closing and casting. Two Brown Boveri 70-kw pressure-type, portable electric mould driers are installed for the pressure drying of moulds and cores *in situ*. Use is made of the battery trucks for towing the "frictionless" mould bogies through the stoves to the adjacent bay, and also, in a similar manner, for moving the heavy mould-transfer bogies.

Fettling and Dressing

After the castings have been cooled, the boxes are knocked-out at the central knock-out station

and the castings loaded up and transferred to the fettling and dressing department. This section is housed in a single-bay building of reinforced-concrete construction, with full road access into each end. The principal fixed fettling equipment consists of a dual, swing-table Wheelabrator plant and 24-in. high-speed snagging grinders. In addition to this, two Luke & Spencer portable, swing-frame grinders (of the latest dust-suppression type) are in operation, one supported from a swinging jib and the other supported from an overhead runway which traverses the side of the building. This grinding equipment is augmented by portable units supplied from a 5-kw Hicycle generator. Oxygen for cutting off purposes is piped down the building from a central storage-cylinder battery.

Compressed-air points are situated down the sides of the building for supplying the pneumatic chipping-hammers. Two oil-fired annealing stoves are installed, one of which can accommodate large-diameter cast-steel rings, as used in tin dredger construction. Also, a large quenching tank is installed in front of one of the furnaces for the treatment of manganese-steel castings, which represent a substantial proportion of the steel-castings output.

Patternshop

The patternshop and pattern-store is situated on a reinforced-concrete floor above the fettling shop, the full length of the bay being allocated to pattern preparation and storage. Modern wooden pattern-making machinery, which includes a Wadkin "Universal," semi-automatic pattern miller, with an extensive range of tool and cutter equipment, is available. The pattern-store is fitted with suitable racks, and the patterns are positioned so that they can be readily located from a central indexing system.

Power Generation

A central compressed-air and electric-power generating station is located at one end of the fettling and patternshop buildings. The compressed-air supply is delivered by a 475 cub. ft. per min. compressor made by Consolidated Pneumatic Tool Company, Limited. The building also houses Hicycle generating equipment. When the foundry

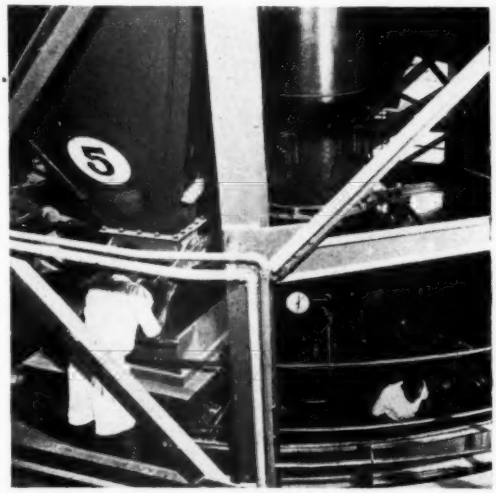
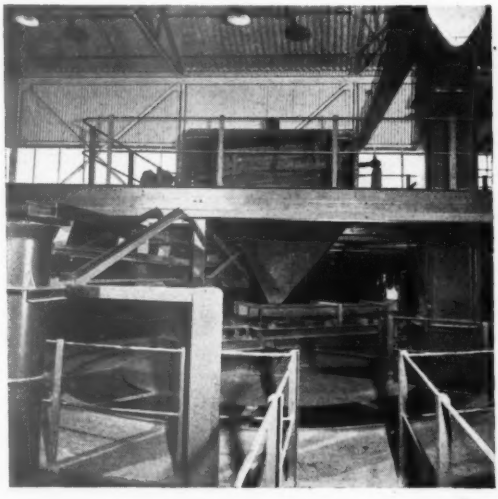


FIG. 16.—(*above*) *One of two batch measurers, rotating at will under the segmental hoppers, for transferring sand to the mill, and* FIG. 17.—*Sand distribution to machines, etc., by battery truck, running along overhead gangways.*

FIG. 15.—*Top of the segmental sand-hopper structure, showing the screen, elevator, and distribution conveyor.*



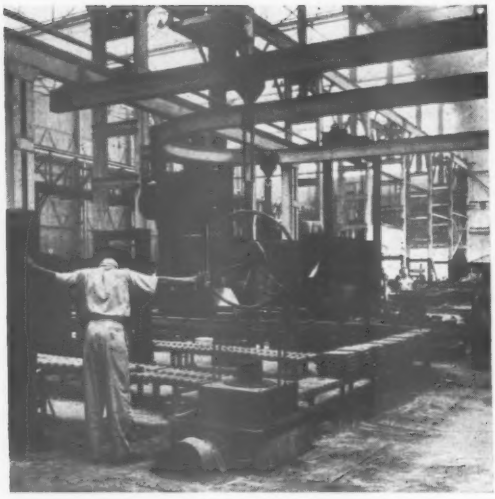


FIG. 18.—*Vibratory knock-out for the smaller moulds at United Engineers' foundry.*

FIG. 19.—*Unusual type of mould-closure effected by pneumatically lifting a section of roller conveyor.*

was being constructed, there was a serious shortage of electric power in Singapore, which resulted in frequent power-cuts. To guard against this hazard when molten metal has to be handled, two Diesel-electric generating units were installed, the main Paxman unit being supplemented by a Ruston unit for operation during light-load periods. In this power station, there is also the distribution and metering boards, together with the main switch-gear, the whole being attractively laid out.

Amenities

The foundry amenities, which include lavatories, washing accommodation and facilities for serving drinks and food, are incorporated into the scheme. Together with the general ventilation provided, the ample gangways and overall foundry building lay-out and planning, compare very favourably with modern requirements, as recommended in the "Garrett Report."

FIG. 20.—*Bogie train taking moulds of the smaller type to the casting point.*

FIG. 21. — *Impeller rammer / Herman rollover machine station for medium-size moulds. Overhead batch distribution of sand is arranged.*

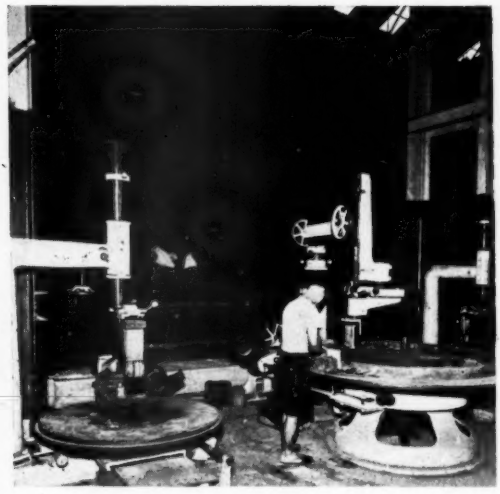


FIG. 23.—*Two of the battery of wheel-moulding machines installed to cater for a demand for cast gears.*

General

It will be seen from this article that many of the plant and units are of orthodox, proved design. The originality in the scheme is mainly in the manner in which these units have been linked to give maximum flexibility, and to cover the widest possible range of components. The exploitation of modern handling methods, although as yet not commonly accepted by all foundries, are what most executives of the industry consider to be essential in future for any foundry which is to survive world competition.

On the administration side, a system of stock- and quality-control is being implemented, so that

FIG. 22.—*Section of the foundry devoted to heavy moulding; note the large circular moulding box of linked-plate construction.*

FIG. 24.—*Core- and facing-sand distribution by portable, shovel-out hoppers.*

a high casting quality can be maintained under what may at times, be difficult operating conditions, caused by the widely scattered sources of supply and fluctuating quality of raw materials which have to be used.

The working conditions of the operators are ideal, when compared with the standards of any country and, although the foundry has only been in operation a few months and the re-building entailed a complete site removal and change of methods, the "teething" troubles have been less than anticipated.

The design, buildings, steelwork and much of the plant, was constructed in the engineering shops of the company—United Engineers Limited, and full credit must be given to the managing director, Mr. H. K. Rodgers, and his enthusiastic colleagues and staff whose personal attention alone has enabled such a project to be brought to fruition in south east Asia.

MAIN CONTRACTORS FOR KAMPONG BAHRU FOUNDRY

Buildings, structural steelwork and main plant	United Engineers, Limited.
Overhead electric cranes	Vaughan Crane Company, Limited.*
Simpson sand mills	August's Limited.
Wheelabrator plant	Tilghman's Limited.
High-speed snagging and swing-frame grinding equipment	Luke & Spencer, Limited.
Moulding machines and impeller rammers	Foundry Plant & Machinery Limited. Pneulec Limited. J. W. Jackman & Company Limited. Gibson Battle Ppty Company Limited.
Spinning plant	Constructional Engineering Company Limited.
Miscellaneous conveying, lifting and transporting equipment	Barber-Greene Company (U.S.A.)* Clark Fork Lift Trucks Limited.* E. A. Roper & Company, Limited, etc.
Patternshop machinery	Wadkin Limited.
Air compressors, pneumatic Hicycle equipment	Consolidated Pneumatic Tool Company Limited.*
Electrical power-generating plant	David Paxman, Limited.* Ruston & Hornsby, Limited.*

* United Engineers Limited are agents for these firms.

Germany to End Export Incentives

Germany has decided to abandon export incentives by means of tax adjustments when the existing German law on the subject expires at the end of next year. A joint statement issued by the British and German governments recalls the conversations on economic matters in Bonn on May 7 and 8 between Mr. Butler, Chancellor of the Exchequer, and German Ministers, and outlines the general policy of both governments that international trade competition should follow natural lines and develop freely.

It is pointed out in the statement that although it is sometimes alleged that the price of steel in the U.K. is lower than in Germany as a result of some form of subsidy, this is not so; the steel industry receives no subsidy of any kind. Similarly, the National Coal Board in the U.K. is under a legal obligation to pay its way without any Government subsidy. The Board's price structure covers the full costs of production and is in no way designed to favour any one type of consumer in the U.K. at the expense of another. As regards the price of steel scrap, the U.K. still finds it necessary to control this, as do a number of other countries, to restrict its export.

Bingley Hall Exhibition

An interesting range of machine and precision tools was on view at Bingley Hall, Birmingham, at the end of last month. The exhibition was arranged by B. Elliott & Company, Limited, London, and showed products of the Elliott group which comprises seven companies in this country and three subsidiaries abroad. A range of over 60 machines was displayed and included centre-lathes and machines for milling, drilling, grinding, shaping, as well as for hacking and band-sawing. Of interest to founders was a "Hydro Vice," a self-contained hydraulic vice, tested up to a pressure of 18,000-lb. per sq. in. and fitted with a quick-release valve. The vice is claimed to be particularly useful for heavy work because of its high gripping power and also for repetition work because of its ability to clamp and release at high speed. A "U.O." universal milling machine with a table 36 by 9 in. is a new design in this size, and is intended for small work and for educational purposes with apprentices and in technical colleges. A new type of bed is provided on a 8½-in. lathe, called a chip-flow bed, it is notable for the facility for the rapid removal of swarf.

Book Reviews

Entwicklung der Räder für Lastwagen und Omnibusse. (Development of wheels for lorries and omnibuses.) Published in connection with their 150th anniversary by Georg Fischer-Werke, Switzerland.

Beautifully-produced, this book is designed to place the evolution of the wheel into its very important perspective. Starting with the oldest wheel known to history (*circa* 3,500 B.C.) found in 1929 at Ur in Mesopotamia, by Woolley, the book traces subsequent developments down to the present time. An interesting example dealt with in the book is the cortaillod bronze wheel, the oldest one discovered in Switzerland and the forerunner of the modern cast wheel.

The second part of the book opens with an illustrated description of a cast wheel for use with solid rubber tyres made by the Fischer company, about 1900. The final section covers the making of wheels for modern lorries, motor coaches and the like. All sections are profusely illustrated. V. C. F.

Procedures in Experimental Metallurgy. By A. U. Seybolt, PH.D., and J. E. Burke, PH.D. Published by John Wiley & Sons, Inc., New York; and Chapman & Hall, Limited, 37, Essex Street, London, W.C.2. Price 56s. net.

This book provides a wealth of practical knowledge concerning many of the experimental methods of the modern metallurgical laboratory gathered together in handy form. Its aim is to describe the preparation of metal samples up to the point of making observations on their properties so that investigational techniques such as microscopic examination, X-ray diffraction, thermal analysis and mechanical or magnetic testing are properly excluded.

The first part of the book deals with the design of electrical-resistance and induction furnaces for various purposes and temperature ranges, and proceeds to describe the types of pyrometer and temperature-control systems most applicable in the laboratory. The inclusion of a chapter on the manufacture of special refractories is particularly useful, as crucibles and other articles are often not available in the exact shape or composition essential to the experimental metallurgist. Controlled atmospheres and vacuum techniques are dealt with rather briefly, but adequately, in view of the fact that in these days the research worker does not expect to have to design and build major elements of a vacuum system such as pumps and measuring devices. The subjects of electric furnaces, atmosphere control and vacuum techniques are amplified in later chapters on melting and casting, heat-treating, and the preparation of pure metals.

The economic aspects of forging, rolling, swaging, drawing and extrusion are usually of small interest to the investigator who is mainly concerned with carrying out these processes with the absolute minimum of contamination or wastage on samples which are often absurdly small. Under the title "Fabrication of Metals" the reader will find many laboratory tips which would never be mentioned in standard production text-books. On the other hand, laboratory-scale operations on powder metallurgy are not far removed from those in practice and the main reason for including these is that solid samples of some metals and compounds can only be prepared by pressing and sintering, whilst with other metals the production of a sintered electrode is the obvious preliminary to arc-furnace melting. The powder methods and special equipment used for the preparation of very small but uniform samples for thermal equilibrium and similar studies are not specifically mentioned.

The chapter on the preparation of pure metals refers to a number of special reduction and purification techniques, but the metallurgist concerned with a particular problem within this vast and difficult field should not expect to learn much within such limited space. On the other hand, the more restricted subject of grain growth and single-crystal production is well covered.

References to publications and to suppliers of commercial equipment and materials are most usefully collected at the conclusion of each chapter. Here, the British reader will find himself at some disadvantage for, though he will have little difficulty in tracing references in American scientific journals, he will in general have to find out independently if similar equipment and materials are available in this country.

The book is well written and the clear, line-drawing illustrations commendably convey principles rather than details or actual dimensions. Some of the techniques described may be regarded as normal production methods, adapted to the small-scale but often technically-exacting requirements of the investigator, but in other instances they have as yet no counterpart in industrial-scale operations and may only have been referred to previously in connection with the particular researches for which they were originally devised. The book will, therefore, be of immediate value to scientific investigators and, since the laboratory technique of to-day often becomes the established industrial practice of to-morrow, it should also prove informative and stimulating to those whose main concern lies in fields of development beyond the research laboratory.

M. L. B.

Metallurgy of Welding, by Walter H. Bruckner. Published by Sir Isaac Pitman & Sons, Limited, Parker Street, Kingsway, London, W.C.2. Price 30s. net.

This book treats a subject which has in the past been somewhat neglected, a subject, in fact, which foundrymen cannot ignore. The book is quite frankly American in its approach, and most of the references are to American literature. However, the divergencies of practice are probably greater with respect to resistance welding than with the other processes, and the treatment of arc welding, gas welding and Thermit welding, in which readers of this JOURNAL will be more interested, is reasonably well done. On the other hand, there is little reference to repair work, and some of the theoretical aspects are probably dealt with at too great length to be of much use to the practical man. The chapters on residual stresses and costing are of interest, the latter subject being sometimes neglected in English publications. The price of 30s. should not deter those who wish to study the subject in some detail.

K. W.

Apprenticeship Courses

The United Steel Companies, Limited, have invited applications from public schoolboys for its Student Apprenticeship Course starting in September next. The course will cover three years' organized training for positions on the production, commercial and technological staff of the Companies. Practical experience in iron and steel works and appropriate theoretical studies at local Colleges of Technology will be provided, and a salary adequate for trainees to support themselves away from home will be paid during training. It is stated that candidates should usually hold a General Certificate of Education at Advanced Level. Details of this and other training schemes of the Company may be obtained from The Chief Education Officer, 17, Westbourne Road, Sheffield, 10.

New Equipment

Crane Protective Device

The British Thomson-Houston Company, Limited, Rugby, announce the production of type CPS 298 protective equipment for 3-phase systems for crane "down-shop" leads. This two-unit equipment is designed to give protection against hazards arising from the breakage of a bare overhead conductor as employed to feed an overhead crane. Normally, in the event of such a breakage there is a possibility that an appreciable length of live-conductor may fall down with consequent danger to life and risk of damage to equipment at ground level.

Scheme Details

The scheme is essentially a simple one and involves a minimum of parts. Fundamentally an impedance network is created, connected in star to each end of the three-phase "down-shop" leads. The two star points are connected through a rectifier feeding a sensitive relay. Normally, with all three conductors intact, the two star points are at the same potential and consequently there is no current-flow through the relay. Should one conductor break, however, the two networks immediately become unbalanced and a voltage exists between the two star points; current flows and thereby energizes the relay. A normally-closed contact on the relay is connected in series with the under-voltage coil normally present on the feeder circuit-breaker; thus the relay in opening causes the circuit-breaker to trip and interrupt the supply to the crane-wires.

A salient feature of the scheme is the need for only one pilot wire between the two networks at opposite ends of the system. The essential equipment is housed in two small die-cast boxes approximately 7 by 7½ by 5 in. deep. The first accommodates the one network together with three fuses, the sensitive relay, rectifier unit, and condenser; the second houses the other network, three fuses, and a test switch. The test switch is connected in one line of the network so that by opening the switch the effect of a broken conductor is simulated and the breaker should trip.

Vibrating Conveyors and Feeders

On the stand of Coleman Wallwork, Limited, at the Mechanical Handling Exhibition, there was, in addition to their new shell-moulding machine, a display of Hewitt-Robins vibrating conveyors and feeders, which they now manufacture under licence. It is claimed for these interesting machines that:—(1) They can handle most types of material whether it be hot or cold, wet or dry, light or heavy; (2) the machines are mounted on soft coil springs so there is little or no load on the bearings or the shaft; (3) there are no vibrations transferred to the foundations or supporting steel work; (4) very little maintenance is required to keep these machines in production; (5) they can be operated horizontally, downhill, or uphill to 10 deg. at a rate of 30 to 40 ft. per min., depending on the material and the depth of the load; and (6) the stroke of the vibrator can be varied by adjustment to the counter-weight, which alters the impact force. This unique feature gives a much wider use as it is possible to obtain maximum efficiency.

Portable Cutting-off and Grinding

The latest addition to the range of milling and metal-working machines made by Flexible Drives (Gilmans) Limited, 195, Cross Street, Smethwick, is a cutting-off-disc machine called the "Flexmaster". The accompanying illustrations are self-explanatory and show: Fig. 1. Disc cutting halfway through a riser on a pump-body casting, where it is clear that the unit is not hindered by any power unit close to the work and, Fig 2, a quick-change grinding handpiece takes the place of the disc for final smoothing.

The equipment is also suited to the dressing of welds.

FIG. 1.—*Close-up of disc-cutting of a riser on a pump-body casting.*

FIG. 2.—*"Flexmaster" unit as adapted for grinding a riser stub.*

Cupola Development*

First Report of Sub-committee T.S.43 of the Technical Council of the Institute of British Foundrymen

Constitution of Sub-committee T.S. 43

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R. P. Shaw
W. H. Smith
E. Walker
C. H. Wilson, M.I.I.A.
G. Lambert (secretary)

Terms of Reference.

Sub-committee T.S.43 was appointed by the Technical Council in December, 1951, to consider aspects of cupola development with the following terms of reference:—"To investigate the hot-blast system, carburization, desulphurization, water cooling and combinations of these."

Introduction

The cupola furnace is likely to remain the standard melting unit for cast iron for a considerable time and recent technical advancements have indicated that its value can be increased. This Report is mainly a review of existing practical experience in Britain. Emphasis is laid on results achieved rather than upon details of operation.

British performance data of the hot-blast cupola have been lacking in the past and the results now reported are those being currently obtained by employment of up-to-date equipment.

Methods of water cooling applied to acid-lined and basic-lined cold-blast cupolas have been investigated, and an extension of previously-published works have been made available to the sub-committee. The combination of heated blast and water cooling is attracting attention and the results obtained from a unit combining these modifications are reported.

Ability to carburize scrap charges to a greater extent than in conventional practice is an accepted requirement of the industry, particularly for those foundries producing castings in low-phosphorus iron. Means of increasing carbon pick-up would give relief during periods of pig-iron shortage and could be economically attractive at current raw material prices. Particular note has, therefore, been made of the effect on carbon pick-up of hot-blast operation and basic slag-practice. The influence of these modifications on sulphur content has also been studied.

*Presented at the Institute of British Foundrymen's fifty-first annual meeting in Glasgow.

HOT-BLAST CUPOLA OPERATION

The revival of interest in the use of heated blast is mainly due to the development of improved methods of recuperation by firms specializing in heat-exchange units, particularly in continental Europe. Recuperative units of improved design, capable with suitable ancillary equipment of pre-heating cupola blast to 500 deg. C. have been installed on cupolas in many European foundries. Papers dealing with the theory and application of hot blast are numerous,[1,2,3] and the slow progress so far made in this country may be due to potential users not being in possession of adequate information for the assessment of its true economic value. The main claims for hot blast which relate to economic operation are:—

(*a*) Fuel economy by reduction in consumption or by satisfactory use of coke of lower quality.
(*b*) Increased melting rate.
(*c*) High tapping temperature.
(*d*) Increased carbon pick-up by scrap.
(*e*) Decreased losses of silicon and manganese and reduced sulphur pick-up.
(*f*) Decreased losses of metal by oxidation.

Only five installations are currently in operation in Britain and the experience available is, therefore, limited. However, the results presently being obtained by four of these units have been made available to this Sub-committee and are now submitted,

Cupola Development

prematurely perhaps, since it is believed that information will be helpful to potential users in determining the economies possible in their own individual cases.

It is not considered necessary to provide details of the available units as these have been fully described elsewhere.[4,5,6,7] Discussion will, therefore, be confined to operating experience and the results obtained. For the purpose of this Report, these firms have been designated by the letters A, B, C, and D, and the relevant information is tabulated in Tables I to IV.

Plant A employs a recuperator of the flat-tube horizontal type similar to that of Plant C, but working at a blast temperature of 350 deg. C. The type of casting produced from this unit does not require metal at a high temperature and the coke proportion is very low, remaining unchanged at 8.1 per cent. with the introduction of hot blast. An increased tapping temperature is obtained when the same quality of coke is used and 50 per cent. of best coke has been replaced by an equivalent amount of "furnace" grade.

A hyper-eutectic charge is used which prevents any comparison with other units as far as carbon pick-up is concerned but lower carbon content is charged in the hot-blast cupola than in the cold-blast cupola to give the same carbon in the remelt. Silicon loss has been reduced; manganese loss remaining unchanged, and a lower sulphur pick-up is obtained. The main object of increased cupola output has been achieved and heated blast has provided flexibility with coke quality.

Plant B employs a recuperator of the vertical tubular type which is normally operated at a temperature of 470 deg. C. The results for this unit shown in Tables II to IV, under the heading of hot blast, relate to operation with water cooling, whereas in the cold-blast comparison the furnace was refractory lined. These results, therefore, should not be compared directly with those of the remaining units. Water cooling makes it possible to use a slag of higher basicity with greater control of the sulphur content of the metal (as described in detail under the heading "Hot-blast Water-cooled Cupola Operation"). The iron-scrap content of the charge has been increased by 20 per cent. in replacement of pig-iron with no increase in sulphur content. The coke used in this instance both for cold- and hot-blast operation is of blast-furnace grade. For this reason the iron-scrap content of the charge used in cold-blast operation was restricted because of the sulphur pick-up permissible. The increased loss of silicon is due to operating with a slag of higher basicity.

Plant C employs a recuperator of the horizontal flat-tube type giving a blast temperature of 500 to

TABLE I.—*Cupola Dimensions and Operating Details.*

Plant.	Type of hot-blast unit.	External diameter.	Internal diameter.		No. of tuyeres.	Tuyere ratio.	Tapping method.	Operating hours per day.	Optimum hot-blast temp., deg. C.	Air heater.		
			Hot-blast.	Cold-blast.						Type of fuel.	Quantity of fuel.	Melting rate.
A.	Recuperative	8 ft. 0 in.	4 ft. 10 in.	4 ft. 10 in.	24	6.8:1	Continuous	20	400	—	—	—
B.	,,	4 ft. 8 in.	3 ft. 0 in	3 ft. 1 in.	6	12.6:1	,,	9.75	470	—	—	—
C.	,,	6 ft. 3 in.	3 ft. 10 in.	3 ft. 10 in.	6	5.3:1	Intermittent	9	550	—	—	—
D.	Air heater	5 ft. 2 in.	2 ft. 8 in.	2 ft. 10 in.	6	6.7:1	,,	10.5	450	Town's gas	6,350 cub. ft. per hr.	6.0 tons per hr.

TABLE II.—*Relationship Between Coke Quantity and Metal Temperatures.*

Plant.	Hot blast.							Cold blast.					
	Blast temp., deg. C.	Coke, per cent.	Tapping temp. (deg. C.).			Melting rate, tons per hr.	Coke grade.	Coke, per cent.	Tapping temp. (deg. C.).			Melting rate, tons per hr.	Coke grade.
			Maximum.	Minimum.	Average.				Maximum.	Minimum.	Average.		
A.	340/360	8.1	1,390	1,350	1,370	20/22	Foundry and furnace	8.1	1,350	1,330	1,340	17/18	Foundry
B.	470	12.5	1,471	—	1,455	4.6	Furnace	14.3	—	—	1,460	4.6	Furnace
C.	500/550	9.1	—	—	—	8.4	Foundry	12.5	—	—	—	6.7	Foundry
D.	420/430	10/10.5	1,530	1,490	1,510	6.0	Foundry	14/14.5	1,510	1,480	1,495	4.5	Foundry

TABLE IV.—*Effect on Composition (mixtures quoted in Table III).*

Plant.	Carbon (per cent.)				Silicon (per cent.)							Manganese (per cent.)		Sulphur (per cent.)	
	Hot-blast.		Cold-blast.		Hot-blast.				Cold-blast.			Hot-blast.	Cold-blast.	Hot-blast.	Cold-blast.
	Charged.	Actual	Charged.	Actual.	Charged.	Actual.	Loss.	Gain.	Charged.	Actual.	Loss.	Loss.	Loss.	Actual.	Actual.
A	3.60	3.40	3.70	3.45	2.32	2.10	9.5	—	2.42	2.10	13.2	20	20	0.100	0.100
B	2.84	3.33	2.91	3.37	2.42	2.11	12.8	—	2.05	1.93	5.8	14	17	0.100	0.122
C	2.88	3.28	3.01	3.32	2.33	2.27	1.8	—	2.65	2.34	10.7	15.3	28	0.111	0.112
D	2.23	3.10	2.40	3.0	0.65	0.65	—	—	0.77	0.65	15	29.0	38	0.16	0.20

TABLE III.—*Mixtures Corresponding to Results Tabulated in Table IV.*

	Coke,	Flux (per cent.).	Metal charge (per cent.).
Cold-blast operation.			
Hot-blast operation.			

550 deg. C. Hot-blast operation has shown a 27 per cent. saving of coke with a corresponding increase in melting rate. Increase in carbon pick-up has made it possible to replace pig-iron by steel scrap to the extent of 4 per cent. of the charge and the silicon and manganese losses have been appreciably reduced. Sulphur pick-up has not lessened, but it should be noted that the proportion of limestone added was lowered when heated blast was used. This was in the interest of refractory life, and accounts for the unchanged sulphur content. Metal temperature measurements have not been reported, but the user is satisfied that an increase is obtained, even though the coke proportion has been substantially reduced.

Plant D embodies an air heater externally fired by town gas and operates at 430 deg. C. The castings produced are in whiteheart malleable iron and are of particularly light section. Coke consumption has been reduced by 28 per cent. with an increase in metal temperature, of advantage in the production of thin castings. Melting rate has been increased in proportion to the decrease in coke usage. Losses of silicon and manganese have been decreased and sulphur pick-up lessened.

TABLE III.—*Mixtures Corresponding to Results Tabulated in Table IV.*

Plant.	Desired composition (per cent.).					Hot-blast operation.							Cold-blast operation.						
						Metal charge (per cent.).				Flux (per cent.).		Coke, per cent.	Metal charge (per cent.).				Flux (per cent.).		Coke, per cent.
	T.C.	Si.	Mn.	S.	P.	Pig-iron.	Steel scrap.	Iron scrap.	Ferro-alloys.	Lime-stone.	Fluor-spar.		Pig-iron.	Steel scrap.	Iron scrap.	Ferro-Alloys.	Lime-stone.	Fluor-spar.	
A.	3.50	2.10	0.30	0.08	1.00	75	—	25	—	1.8	—	8.1	75	—	25	—	1.80	—	8.1
B.	3.35	2.00	0.30	0.12	0.20	42.4	21.6	36.0	—	2.80	0.40	12.5	62.4	21.6	16.0	Fe Mn 0.13	3.2	0.5	14.3
C.	3.35	2.25	0.70	0.12	0.12	33	20	47	—	1.07	—	0.1	37	16	47	—	3.58	—	12.5
D.	3.00	0.65	0.35	0.20	0.10	4.2	28.3	66.0	Fe Si 1.50 Fe Mn	2.80	—	10/10.5	5.7	25.8	66.0	2.50 Fe Si Fe Mn	3.7	—	14/14.6

Operating Experience

Although recuperative plant appears to be somewhat complicated, experience has shown that with the instrumentation commonly installed, operating details are quickly understood by cupola operators working under adequate supervision.

Apprehension is often expressed on the effect of ash and dust deposition on the operating efficiency of recuperative systems. Solid particles are inevitably drawn through the various portions of the installation. The coarser particles normally separate in the offtakes and dust-catcher, while the finer solids pass through and deposit within the heat exchanger. The quantity and rate of dust deposition depends on the type and condition of the charged material and the velocity of the gases through the recuperator. The extent of deposition determines the period over which the unit may efficiently be operated between cleanings. Failure to remove dust lowers the efficiency of the heat-exchanger, with a consequent lowering in blast temperature.

In the recuperative plants, cleaning is carried out after each shift by compressed-air percussion-lance in the case of horizontal tubes, or by wire flue-brush in the case of vertical tubes, the total man/hours required varying between 10 and 15 per week. Plant B has provided the following information on quantities and composition of the dust:—

Collected between gas take-off and recuperator (coarse particles)	2.64 lb. per ton of metal melted
Deposited in recuperator tubes (fine particles)	1.43 lb. per ton of metal melted

Composition.	SiO_2	Al_2O_3	Fe_2O_3	Mn_3O_4	CaO	SO_3	CaF_2	C
Coarse (per cent.) ..	43.7	1.70	6.60	0.30	8.1	4.7	17.0	15.8
Fine (per cent.)	45.1	5.70	11.6	1.15	12.8	7.4	12.8	—

Dust accumulation does not necessarily present a problem, but efficient removal is an essential feature of maintenance in a recuperative system. For cupolas operating continuously, some system for removal of dust from the gases before they enter the unit would be a distinct advantage. Alternatively, a method may be introduced involving intermittent or periodical dislodgment during the melting operations.

Improvements in operating flexibility have been noted. For example, more rapid rise in the temperature of the iron is achieved at the commencement of the melt, particularly when the heat exchanger is given a preliminary heating. Plant B has reported that pre-heating of the recuperator for thirty minutes, using 2,000 cub. ft. of coke-oven gas, will be sufficient to raise the temperature of the air blast to 200 deg. C. initially, and this rises to 400 deg. C. within twenty minutes of commencement of blowing. Without the initial pre-heat and when using only the waste gas available from the cupola, the blast temperature increase is 11 deg. C. per min.

Cupola Development

Advantage is also derived from the more rapid increase in metal temperature which is possible after enforced or periodic shut-downs. It has also been noted that the melting rate can be varied to a greater degree without affecting the melting conditions. The higher temperatures in the tuyere and melting zone facilitate cleaner operation with less tendency for slag to solidify around the tuyeres.

Refractory consumption when operating with the lower coke proportions made possible by hot blast has been found to be no greater than in the normal cold-blast cupola. Moreover, experience has confirmed the earlier reports that the height of erosion is lessened and the radial depth increased. No information is yet available on lining consumption associated with operation of the hot-blast cupola at the higher coke-ratios used to give maximum carbon pick-up. It is probable, however, that in such cases lining consumption will be greater and water cooling in some form justified.

Increase in melting rate has been observed, particularly in relation to reduction in coke proportion, but accurate quantitative data on this point are not yet available. Further information is also required to establish the effect of heated blast on the total loss of metal by oxidation.

Comparison between Cold- and Hot-blast Performance

Opportunity for experiment on hot-blast installations is restricted because most units are engaged on specific schedules for production of definite types of metal. Fortunately, however, information has been collected from Plant B where a series of production melts was undertaken to allow a comparison to be made between cold- and hot-blast performance. The cupola was lined with acid refractory to an internal diameter of 36 in., and with no cooling system. During the period of comparison, the hot- and cold-blast melts alternated daily, with a blast-furnace coke in constant use.

The object was to compare the effect on temperature and composition of hot- and cold-blast operation for comparable coke quantities over a range of coke-to-metal ratios. The data are given in Table V, and the results, which are plotted in Fig. 1 (*a*) are discussed below.

Effect on Temperature.

Tapping temperature was increased by 50 deg. C. by use of heated blast when the coke quantity was held constant. In the cold-blast unit 16.7 per cent. of coke was needed to give the same metal temperature as was obtained in the hot-blast counterpart by use of 10.5 per cent. coke. This indicates a possible saving in coke of 37 per cent.

Effect on Carbon Pick-up.

The increase in carbon pick-up due to heated blast amounted to approximately 0.10 per cent. carbon through the range of coke proportions up to 15.4 per cent. A pronounced increase, actually 0.21 per cent. of carbon, was noted when comparison was made at 16.7 per cent. coke. Subsequent production melts made with 16.7 per cent. coke and hot blast, involved adjustment of pig-iron and steel contents of the charge to take advantage of this greater pick-up of carbon, and it was found that this made possible an increase of from 22 to 35 per cent. of steel in the charge while holding the carbon content at the desired level of 3.35 per cent. The proportion of scrap-iron charged was held at 16 per cent. throughout, and the 13 per cent. increase in the steel scrap charged was entirely in replacement of pig-iron.

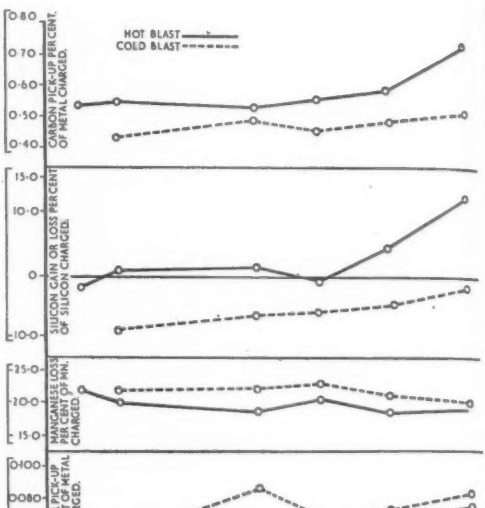
HOT BLAST
COLD BLAST
CARBON PICK-UP PER CENT. OF METAL CHARGED.
SILICON GAIN OR LOSS PER CENT OF SILICON CHARGED.
MANGANESE LOSS PER CENT OF MN. CHARGED.
SULPHUR PICK-UP PER CENT OF METAL CHARGED.
TEMPERATURE °C (IMMERSION)
COKE PER CENT.

FIG. 1 (*a*).—*Comparison between the performances of hot- and cold-blast cupolas* (*data shown in Table V*).

Effect on Silicon.

Silicon loss was distinctly decreased and, indeed, a pick-up was noted in those melts with a high proportion of coke, the gain being 12.5 per cent. with 16.7 per cent. coke charges. However, it is of interest to note that in the subsequent melts earlier mentioned and in which the proportion of steel in the charge was raised to keep carbon constant, this silicon gain was not obtained and the silicon content of the metal remained unchanged from that charged.

Effect on Sulphur.

The sulphur pick-up with identical quantities of coke shows a slight general decrease when heated blast is used. When advantage is taken of the

TABLE V.—*Comparison Between Hot- and Cold-blast Performances.* (*Charged Material: Cast-iron Scrap, 16 per cent.; Steel Scrap, as shown, and Pig-iron, remainder.*)

Blast	Coke, per cent.	Total tonnage melted.	Refractory lb. per ton.	Wind-belt temp., deg. C.	Average metal temp. at spout, deg. C.	Silicon (per cent.).			Manganese (per cent.).			Sulphur (per cent.).			Effect on carbon (per cent.).			
						Charged.	Average actual.	Loss or gain.	Charged.	Average actual.	Loss.	Charged.	Average actual.	Pick-up.	Steel charged.	Charged carbon.	Desired carbon.	Actual carbon.	Carbon Pick-up.
Hot	16.7	122	34.0	458	1,521	2.01	2.26	+12.5	0.89	0.72	19.1	0.053	0.128	+0.075	24.2	2.82	3.35	3.55	0.73
Cold	16.7	272	45.7	—	1,495	2.04	2.00	— 1.96	0.90	0.72	20.0	0.053	0.136	+0.083	22.2	2.89	3.35	3.41	0.52
Hot	15.4	319	29.7	445	1,509	2.04	2.13	+ 4.4	0.91	0.74	18.7	0.054	0.122	+0.068	22.1	2.89	3.35	3.48	0.59
Cold	15.4	413	32.0	—	1,449	2.09	2.00	— 4.3	0.90	0.71	21.1	0.053	0.126	+0.073	22.0	2.90	3.35	3.39	0.49
Hot	14.3	76	37.45	445	1,516	2.10	2.09	— 0.48	0.91	0.72	20.9	0.053	0.104	+0.051	20.8	2.94	3.35	3.50	0.56
Cold	14.3	134	37.9	—	1,461	2.05	1.93	— 5.8	0.91	0.70	23.1	0.054	0.122	+0.068	21.6	2.91	3.35	3.37	0.46
Hot	13.3	126	40.4	380	1,509	2.13	2.16	+ 1.4	0.91	0.74	18.7	0.053	0.101	+0.048	20.8	2.94	3.35	3.47	0.53
Cold	13.3	84	—	—	1,460	1.96	1.84	— 6.1	0.90	0.70	22.2	0.053	0.139	+0.086	22.4	2.88	3.35	3.37	0.49
Hot	11.1	94	30.0	450	1,498	1.98	2.00	+ 1.0	0.90	0.72	20.0	0.053	0.105	+0.052	22.4	2.88	3.35	3.43	0.55
Cold	11.1	297	30.6	—	1,453	2.04	1.87	— 8.3	0.91	0.71	22.0	0.053	0.109	+0.056	21.3	2.92	3.35	3.36	0.44
Hot	10.5	136	35.2	440	1,497	2.13	2.09	— 1.9	0.91	0.71	22.0	0.053	0.105	+0.052	20.8	2.94	3.35	3.48	0.54

lower coke proportions made possible with hot blast, there is a substantial reduction in sulphur pick-up for a constant flux charge.

Effect on Manganese

Use of heated blast was found to cause only slightly decreased loss of manganese and this did not appear to be greatly affected by the quantity of coke charged.

Summary

Although further work of this type is probably necessary to confirm these findings, the sub-committee considers that the main advantages claimed for heated blast are in fact achieved. Use of hot-blast cupolas gives scope for fuel economy, and efficient operation becomes less dependent on coke quality. When fuel economy is practised, satisfactory metal temperatures are obtained with some gain in carbon pick-up, reduction in silicon loss and a lessened pick-up of sulphur. Where coke saving is of less concern, hot-blast operation with normal coke quantities gives higher carbon pick-up, permitting greater use of steel scrap in replacement of pig-iron in the metal charge. When no reduction is made in the coke charge and extra steel is used, no significant reduction in the extent of sulphur pick-up can be expected in "acid" practice.

Heat-exchange units with ancillary equipment now available for pre-heating blast to 500 deg. C. are proving satisfactory in service and show a considerable improvement over earlier designs. Delay in the extension of the use of hot blast in this country has been due primarily to the high installation cost and doubt as to whether or not the capital expenditure would be justified. From the information available to the Sub-committee it would appear that the savings which might be effected in coke consumption alone are unlikely to justify the high installation cost.

Economic advantages are more apparent in the replacement of pig-iron with steel scrap and ferro-silicon while the present price differential between the two former constituents prevails. The extent of the influence of hot blast on carbon pick-up already reported enables an estimation to be made of the savings to be anticipated in the metal charge as also the cost effect of lower loss of silicon.

The economic advantage of hotter metal depends on the class of casting being produced and is a matter for each individual foundry to assess. Having made an assessment of the savings in metallic constituents and the added operating costs, then the pay-off period for the equipment will be determined by the estimated through-put of the unit in a given time.

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(To be continued)

THE ALUMINIUM DEVELOPMENT ASSOCIATION, 33, Grosvenor Street, London, W.1, has published a directory of its members. It opens with an index of products, each item carrying page numbers giving the names and addresses of firms making it. Because there is a system of Group membership, the cataloguing is somewhat untidy, and at least somewhere a complete alphabetical list should be given. There are 13 main headings, but actually there must be over fifty concerns included.

Institute Elects New Members

At a meeting of the Council of the Institute of British Foundrymen held at the Central Hotel, Glasgow, on June 22, the following were elected to the various grades of membership.

As Subscribing Firm Members:

Birco Motor Cylinder Company, Limited, Oldbury Road, Albion, West Bromwich; (representative: J. A. Hatton); Cochranes (Middlesbro') Foundry, Limited, Ormesby Ironworks, Midlesbrough, Yorks. (representative: C. H. Wilson).

As Members:

L. Abbott (Coleman-Wallwork Company, Limited, Stotfold, Beds.); W. D. Bullows (Castings, Limited, Walsall); T. Clark (Joint Iron Council); W. H. Cockerill (Castings, Limited); A. G. Coyte (S.E.M. Patterns. Limited, London); D. Goodwin (Brentford Foundries, Limited); T. E. Gray (Lafarge Aluminous Cement Company, Limited, London); H. Hanks (Alfred Ellison, Limited, West Bromwich); W. D. Hardley* (Moreland Metal Company, Pty., South Melbourne, Australia); G. H. E. Mercer (Alexander Metal Company, Limited, Bilston, Staffs.); L. J. Moore (Brentford Foundries, Limited); W. P. G. Parkes (Patternmakers (Coventry), Limited); W. M. Pratt (Ace Patterns, Limited, Brunswick, Victoria, Australia); W. A. Ritter (Britannia Iron & Steel Works, Limited, Bedford); T. Ward (Patternmakers (Coventry), Limited); K. C. White (K. C. White, Williamstown, Victoria, Australia).

As Associate Members:

D. A. Adegoke (Marine Department, Apapa, Nigeria); K. H. Atkiss (C. & B. Smith, Limited, Wolverhampton); Jas. Bell (Jos. Gorman & Sons, Glasgow); Tom Bell (Stockton Casting Company, Limited, Stockton-on-Tees); F. W. Bradley (Wm. Mills, Limited, Wednesbury, Staffs); J. E. C. Eaton (Sternol, Limited, London); C. Elderfield (High Duty Alloys, Limited, Slough); E. R. Evans (British Cast Iron Research Association); R. Fish (British Filters, Limited, Maidenhead, Berks.); N. C. Ganguli* (Government of India, Indian Research Institute, Dhanbad, India); E. Gibson (K. & L. Steelfounders & Engineers, Limited, Letchworth); N. J. Griffiths (Wm. Mills, Limited); K. V. Kamath (Victoria Jubilee Technical Institute, Bombay, India); P. S. Khokhar (Shir V. Polytechnic Institute, Phagwara, India); D. Kinnon (Lovell & Company, Limited, Southampton); R. H. Mardell (General Refractories, Limited, Leicester); A. C. Mills (Victorian Railways Laboratory, Newport. Victoria, Australia); J. D. Pennington (Platts (Barton), Limited, Urmston, Lancs); D. C. Poole, Taunton, Somerset); M. D. M. Poyner (Foundry Services South Africa (Pty.), Limited, Doornfontein, Johannesburg); W. T. C. Roden (K. & L. Steelfounders & Engineers, Limited, Letchworth); G. Smart (Midland Tar Distillers, Limited, Birmingham); G. R. Smith (Johns & Waygood, Limited, South Melbourne, Australia); D. H. Snelson (Foundry Services, Limited, Birmingham); B. H. C. Waters (Wm. Jessop & Sons, Limited, Sheffield); L. Wilson (Wm. Mills, Limited); Wm. Donald† (Colvilles, Limited, Motherwell); R. E. Gossett† (E.M.I. Engineering Development, Limited, Feltham, Middlesex); Miss C. J. Hanson† (Molineux Foundry Equipment, Limited, London); P. S. Miles† (Maghelia Metal Company, New Jersey, U.S.A.); W. M. Sayer† (Geo. Cohen, Sons & Company, Limited, Leeds); W. E. Spraggon† (Consett Iron Company, Co. Durham); W. C. Stirk† (Consett Iron Company).

As Associates (over 21):

C. L. Berkland (Dunswart Iron & Steel Works, Limited, Benoni, South Africa); J. N. Bhakta (Eastern Railway, Kanchrapara, West Bengal, India); F. Brownbill (Hawker, Richardson & Company, Melbourne, Australia); B. Buxton (Stockton Casting Company, Limited); G. L. Knowles (Birmingham Small Arms Company, Limited, Birmingham); M. H. Lavington ("Qualcast" (Ealing Park), Limited, London); B. W. Locke (De Havilland Engine Company, Edgware, Middlesex); R. E. Senogles (Dunswart Iron & Steel Works, Limited); P. M. Steward (United Steel Companies, Limited, Stockton-on-Tees).

As Associates (under 21):

F. A. S. Bannister (Shotton Brothers, Oldbury); A. H. Colley (Dunswart Iron & Steel Works, Limited); E. C. H. Gardner (Dunswart Iron & Steel Works, Limited); W. R. Jones (General Electric Company, Limited, Birmingham); D. E. Shirley (Dunswart Iron & Steel Works, Limited); T. A. Wallace (S. Jellyman, Limited, Cannock, Staffs); J. W. Watson (John Vickers & Son, Darlington).

* With effect from September next.
† Transferred.

Personal

MR. W. H. NICHOLSON, manager of the Manchester sales office of the Northern Aluminium Company, Limited, has retired after being in the company's service since 1927.

MR. ALEXANDER G. FORMOY has been appointed training officer to the Council of Ironfoundry Associations. He takes up his duties on August 1. He has had a distinguished career in the navy and as a welfare officer in large industrial organizations.

MR. J. MURRAY GRAMMER has been elected the chairman of the London branch of the Purchasing Officers' Association. This is the largest of the Association's 43 branches and has 800 members. Mr. Murray Grammer is stores buyer for the North Thames Gas Board.

MR. WILLIAM B. WALLIS, the president of the Leckomelt Furnace Corporation, has been honoured through the Pennsylvania State University by the bestowal of the Distinguished Alumnus Award. Mr. Wallis, who has an international reputation as a designer of electric furnaces, is a president of the American Foundrymen's Society and is now serving as president of the Foundry Equipment Manufacturers' Association. He visited this country last year and lectured to a distinguished audience in Sheffield.

Obituary

MR. FRANK HOWARD PAGETT chairman of the directors of Thomas W. Robinson, Limited, Dennis Park Ironworks, Stourbridge died suddenly on June 30 at the age of 59. Mr. Pagett had been with the firm for the past 40 years.

Dr. JOSEPH HENRY JOHNSON, one of the most distinguished engineers in South Africa, died on June 29. Dr. Johnson, who was 75, was chairman and managing director of Dowson & Dobson, Limited, mechanical and electrical engineers, etc. He was born in England and served an apprenticeship at the Crewe works of the London and North-Western Railway before going to South Africa in 1904. In 1910, he was elected president of the South African Institution of Electrical Engineers, since when he has held many such honorific offices, including the presidency of the Chemical, Metallurgical and Mining Society of South Africa in 1940 and of the Associated Scientific and Technical Societies of South Africa in 1944-45.

News in Brief

THE LEIPZIG FAIR is to be held this year from September 5 to 15.

TWO FIRMS building hosiery machinery in Leicester have amalgamated—G. Stibbe and Company, Limited, and I. L. Berridge and Sons.

KEITH BLACKMAN, LIMITED, engineers, of Arbroath, are to build a £4,000 plate store at the corner of Gravesend and Applegate. Plans for the new building have been approved.

THE MANCHESTER JOINT RESEARCH COUNCIL is organizing a Conference on Industry and Science on Friday, July 9, from 10 a.m. to 4 p.m. It is to be held at the University of Manchester.

THE NAME of Exfoliators (Vermiculite), Limited, of 21, Broadwater Road, Welwyn Garden City, Hertfordshire, has been changed to Dupré Vermiculite (Exfoliators), Limited. No change of control or policy is involved.

THE WEST MIDLANDS INDUSTRIAL DEVELOPMENT ASSOCIATION at a meeting on July 1 carried a resolution pledging support for Malvern Urban Council's efforts to obtain sanction for the introduction of light industries into the town.

DUNDEE TECHNICAL COLLEGE has been chosen as the centre for an important engineering course this week. Over 30 lecturers and other experts are gathered from all over Britain to discuss new techniques for analysing the effect of stresses on metals.

A FIRE in the Co-operative Wholesale Society Ironworks (bedsteads, mangles), in Goulbourne Street, Keighley, on June 26, was extinguished by the sprinkler system before the arrival of the Keighley Fire Brigade. Only slight damage was done.

SIR W. G. ARMSTRONG WHITWORTH AIRCRAFT COMPANY, LIMITED, of Coventry, have received a contract worth about $5,400,000 from the United States Navy purchasing office under the United States off-shore procurement programme for the supply of Hawker Sea Hawk aircraft for the N.A.T.O. countries.

A NEW 100 M.P.H. SPORTS CAR has gone into production at Walsall for the home market. The car, the Doretti, has been produced exclusively for the American market for some months, but rising production has enabled the manufacturers, Swallow Coachbuilding Company (1935), Limited, to extend sales to Britain.

THE APPLICATION of plastics to the shell-moulding process is one of the developments on view at an exhibition of plastics organized by Bakelite, Limited. The exhibition is being held at the Bowchier Hall, Institution for the Blind, Newport Road, Cardiff, until July 10. Admission, from 10 a.m. to 2 p.m. daily, is free.

JOHNSON, MATTHEY & COMPANY, LIMITED, have joined the International Telex service, at present providing direct foreign teleprinter communication and to be extended later this year to include transmissions within the United Kingdom. The system enables messages to be received at any time, and will greatly improve contact with associates, agents and customers. The company's number is London 8702.

A TRADE DELEGATION of 12 representatives from the Chinese People's Republic which is visiting Britain as a result of the Anglo-Chinese talks held in Geneva recently was received by the Birmingham Chamber of Commerce on July 1. On July 2 visits were arranged at the works of W. & T. Avery, Limited, the Austin Motor Company, and the Massey-Harris-Ferguson tractor works.

FLETCHER HOUSTON & COMPANY, LIMITED, the Dudley Port ironfounders, report, as was forecast in the chairman's statement last February, that they have formed a wholly-owned subsidiary company known as Keith Lowe Engineers (Dudley), Limited. This subsidiary has acquired for £64,350 the business of toy manufacturers and light engineers previously carried on by Mr. Keith Clifford Lowe at King Street, Dudley.

MR. LOUIS CARTER, managing director of Cone Automatic Machine Co. (Great Britain), the English subsidiary of Cone Automatic Machine Co., Inc., of Windsor, Vermont, U.S.A., announces that the American company is to rent a factory at Smethwick, having last month received permission to have 150,000 dollars (£50,000) capital in Britain. The factory will be used until the company can find a four-acre factory site in the South Birmingham area.

THE INDIAN GOVERNMENT has reduced import quotas on 35 items in a move to assist internal production. Among the items affected are iron and steel buffers for locomotives and wagons; steel drums and barrels; ball bearings; high-tension insulators; and agricultural machinery and parts. Import quotas for 60 items, including industrial raw materials, machinery parts, oil-crushing machinery, and petroleum- and gas-well drilling equipment, have been moderately increased.

THE BRITISH WELDING RESEARCH ASSOCIATION, in its ninth annual report, states that as a result of a special grant from M.S.A. funds, the Association has been able to purchase in the U.S.A. a Sciaky (PMCO. 6ST) 3-phase spot-welding machine and a Baldwin-Tate-Emery 400,000-lb. universal testing machine. This additional equipment will appreciably augment the facilities available at the research station at Abington, and will be displayed at the annual open day there on July 14.

SIR PERCY MILLS, chairman and managing director of W. & T. Avery, Limited, has been reappointed by the President of the Board of Trade as chairman of the National Research Development Corporation, a position he has held since 1949, when the Corporation was founded to exploit or develop such inventions or new techniques as, in its opinion, are not being adequately used. Prof. P. M. S. Blackett, Sir John McL. Duncanson, and Sir Edward de Stein have been reappointed as members. Sir Henry Hinchcliffe and Sir Alan Saunders replace Sir Edward Hodgson and Mr. W. E. P. Johnson.

MORE THAN 300 Birmingham workers and their families, employees of Deloro Stellite, Limited, Shirley, are to be given free railway tickets to anywhere within 320 miles of the city instead of having an annual outing this year. Mr. J. S. Carter, director of the firm, which is a subsidiary of a Canadian company, said that outings are difficult to arrange to everyone's satisfaction, but the firm wishes to show its appreciation of employees' service during the past year. The concession is open to all employees having six months with the firm and will continue until December 31. Many of the employees are planning to use them for their annual holidays.

THREE EMPLOYEES of Crofts and Assinder, Limited, brassware manufacturers of Lombard Street, Birmingham, with an aggregate of 190 years' service with one firm, have won a nation-wide competition open to firms in the furnishing and allied trades to find the trio with the longest aggregate years of service irrespective of status in the firm. Two are brothers, Mr. Joseph Davis aged 81 who has been with the firm for 67 years and

News in Brief

Mr. George Davis aged 72 with 58 years' service. The third is Mr. Harry Glover aged 77 who has served the firm for 65 years. He is one of the old craftsmen in the brassware trade and makes the dies from which the brass plaques are cast.

THE SYNCHRO-CYCLOTRON at Liverpool University—the largest machine of its kind outside the United States—is now in satisfactory operation. It produces a beam of protons of about 400,000,000 volts' energy, and will be used as a tool for pure research in nuclear physics, especially in the properties of elementary particles. The project was started by Sir James Chadwick while he was Professor of Physics at Liverpool, and was carried out under the direction of Prof. H. W. B. Skinner, with Mr. M. J. Moore as the engineer in charge. The machine was built by the Metropolitan-Vickers Electrical Company, Limited, with funds from the Department of Scientific and Industrial Research.

LORD ROCHDALE, President of the National Union of Manufacturers, suggested to the Dudley branch at its meeting on June 24 that entry into industry should be encouraged until it was "the" bright boy's dream—and the nation should place industry upon a pedestal above everything else. New ideas which meant attracting the best of the country's youth could provide an incentive to investment. If everyone in industry abolished the slogan "How much can I get out of it?" substituting "What can I put into it?" there was no limit to what could be produced, Lord Rochdale went on. On transport, he said that decentralization promised an improvement in service. Mr. Gilbert Salter was re-elected chairman of the branch.

THE NEW MECHANICAL-ENGINEERING PREMISES at Birmingham University—the first section of a block which eventually will also include an electrical engineering wing—was opened on July 2 by Dr. J. B. Conant, United States High Commissioner for Germany and formerly president of Harvard University and chairman of the United States Atomic Energy Commission. The building consists of a three-storey frontage containing lecture rooms, a two-storey workshop and an extensive single-storey laboratory block. Before the opening ceremony the vice-chancellor, Dr. R. S. Aitken unveiled a sculptured panel in the central part of the façade, incorporating a device symbolic of mechanical engineering. Mr. Sydney Vernon presented Dr. Conant with the gift of an ashtray decorated with an impression struck by a Boulton and Watt coining die. The die, Mr. Vernon explained, had been made to efface the image of "Carolus II" on a coin and replace it by that of George III.

Production Exhibition and Conference

Following—perhaps too quickly—on the heels of the Mechanical Handling Exhibition, the Production Exhibition and Conference opened yesterday in the National Hall at Olympia. There is a much higher ratio of exhibits by official and semi-official bodies, research institutes, and the like, to commercial exhibits than is usual in displays of this nature. Many important firms associated with the foundry industry are showing, such as W. & T. Avery, Limited; Birmingham Aluminium Castings Company, Limited; John Brown & Company (Clydebank), Limited; English Electric Company, Limited; Ford Motor Company, Limited; Gi'lett & Johnston, Limited; Imperial Chemical Industries, Limited; Manganese Bronze & Brass Company, Limited; Rubery Owen & Company, Limited, and Ruston & Hornsby, Limited.

Parliamentary

Realization of Steel Assets

MR. SWINGLER asked the Chancellor of the Exchequer if he would state, for the capital equipment which had so far been sold to private individuals or companies under the Act to denationalize the iron and steel industry, how much compensation was paid therefor at the time of nationalization, and how much had been paid therefor in the process of denationalization.

MR. JOHN BOYD-CARPENTER, Financial Secretary to the Treasury, who replied, said he doubted whether the comparison requested in the question had much significance as it did not involve comparing like with like. But, including Stewarts and Lloyds, the Iron and Steel Holding and Realization Agency had received or was about to receive some £68,500,000 gross in cash or Government securities. It also retained for future disposal holdings in the companies concerned to a figure of £46,800,000, taken at nominal paid-up values. There would also be added in due course certain other credit items rising out of those transactions, and in particular the agency retained the shares in the Steel Company of Wales formerly held by one of those companies. The value of the agency's investment in those companies, based on compensation values as properly adjusted and attributable, was calculated at £108,800,000.

MR. SWINGLER then asked if it was not possible, taking into account the changed value of money, to give straightforward facts of what was paid in compensation on nationalization and what was now being paid taking into account some of the notorious deals now going on, so that the public might know what was the loss of money involved in the sale of the assets.

MR. BOYD-CARPENTER said that if he had given the figures of compensation paid, without taking into account other additional capital put into the industries concerned, or other changes which had occurred, he would have been misleading Mr. Swingler and making the comparison less favourable for him. On that basis the compensation figure was £106,300,000, not £108,800,000.

English Steel Shareholders' Voting Rights

MR. ROY JENKINS asked the Chancellor of the Exchequer whether the £10,000,000 of capital of the English Steel Corporation still remaining in the hands of the Iron and Steel Realization Agency had any voting rights in normal circumstances.

In reply, MR. BUTLER said that holders of those securities had rights of the kind commonly attached to debentures and preference shares respectively. These did not include voting rights in normal circumstances.

MR. JENKINS then asked if it was the Government's policy, where half the capital of an iron and steel company passed to private hands and half remained in public hands, that all the control of the company should be concentrated in private hands.

MR. BUTLER: "No, not as a general proposition. It happens to have been a convenient operation in this case. That exactly carries out the sense of Section 18 (1) of the Iron and Steel Act."

POINTING OUT that there was a preponderance of shiprepairing, as opposed to shipbuilding, in South Wales, the First Lord of the Admiralty said that the fall in employment in shiprepairing was comparable to that in other areas, and the future level could only depend on the ability of firms in South Wales to secure a share of available work.

FIRST WITH W20

Now BEETLE RESIN *W42

This new synthetic resin core-binder has been specially developed to suit those foundries where fumes and casting odours cause embarrassment. The result of practical co-operation between B.I.P. and leading foundries, Beetle W42 is another example of B.I.P.'s pioneer research and service to the Foundry Industry. W42 has been formulated with the Garrett Report in mind and it possesses all the advantages of Beetle Resin W20, coupled with this important new feature . . .

reduced casting odour

* *Patent Application 32896/58*

B·I·P GROUP

Write for technical information to British Industrial Plastics Ltd., Tat Bank House, Oldbury, Nr. Birmingham

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Pig-iron and Steel Production

Statistical Summary of April Returns

The following particulars of pig-iron and steel produced in Great Britain are from statistics issued by the British Iron and Steel Federation. Table I summarizes activity during the past six months. Table II gives production of steel ingots and castings in March, and Table III, deliveries of finished steel in February, 1954. Table IV gives the production of pig-iron and ferro-alloys in March, 1954, and furnaces in blast. (All figures weekly averages in thousands of tons.)

TABLE I.—*Iron and Steel Price Index and General Summary of Pig-iron and Steel Production*

Period.	Price index, 1938 = 100.			Iron-ore output.	Imptd. ore used.	Coke to blast-furnaces.	Pig-iron, ferro-alloys prod.	Scrap used in steel prod.	Steel (incl. alloy).			
	I. & S.	Coal.	All comdts.						Imports.[1]	Prod. ingots, castings.	Delivrs. finished steel.	Stocks.[2]
1952[3] ..	254	329	323	306	190	228	202	171	29	310	252	683
1953	260	350	323	304	207	237	215	188	18	339	261	962
1953—Nov. ..	260	358	323	292	232	245	229	206	15	363	283	948
Dec.[4]	260	359	321	297	229	244	225	192	12	339	256	962
1954—Jan. ..	259	358	321	307	234	246	230	203	10	360	275	941
Feb. ..	259	359	322	302	230	240	222	201	14	357	289	902
March	260	360	324	322	232	238	231	203	16	365	289	898
April ..	260	360	325	312	236	243	232	200	4	368	—	942

TABLE II.—*Production of Steel Ingots and Castings*

District.	Open-hearth.		Bessemer.	Electric.	All other.	Total.		Total ingots and castings.
	Acid.	Basic.				Ingots.	Castings.	
Derby, Leics., Notts., Northants and Essex ..	—	3.3	11.4(basic)	1.7	0.2	15.7	0.9	16.6
Lancs. (excl. N.W. Coast), Denbigh, Flints. and Cheshire	1.1	26.1	—	1.6	0.5	28.2	1.1	29.3
Yorkshire (excl. N.E. Coast and Sheffield) ..								
Lincolnshire	—	40.2	—	—	0.1	40.1	0.2	40.3
North-East Coast	1.9	74.3	—	1.1	0.4	76.1	1.6	77.7
Scotland	3.7	39.0	—	1.1	0.6	42.7	1.7	44.4
Staffs., Shrops., Worcs. and Warwick ..	—	16.0	—	1.1	0.7	16.1	1.7	17.8
S. Wales and Monmouthshire	3.7	76.2	6.2(basic)	1.1	0.1	86.7	0.6	87.3
Sheffield (incl. small quantity in Manchester) ..	8.2	30.4	—	8.7	0.5	45.9	1.9	47.8
North-West Coast	—	1.4	5.1(acid)	0.5	0.1	7.0	0.1	7 1
Total	18.6	306.9	22.7	16.9	3.2	358.5	9.8	368.3
March, 1954[4]	21.4	300.8	20.9	18.0	3.7	354.0	10.8	364.8
April, 1953	24.2	280.5	22.5	17.7	3.6	337.9	10.6	348.5

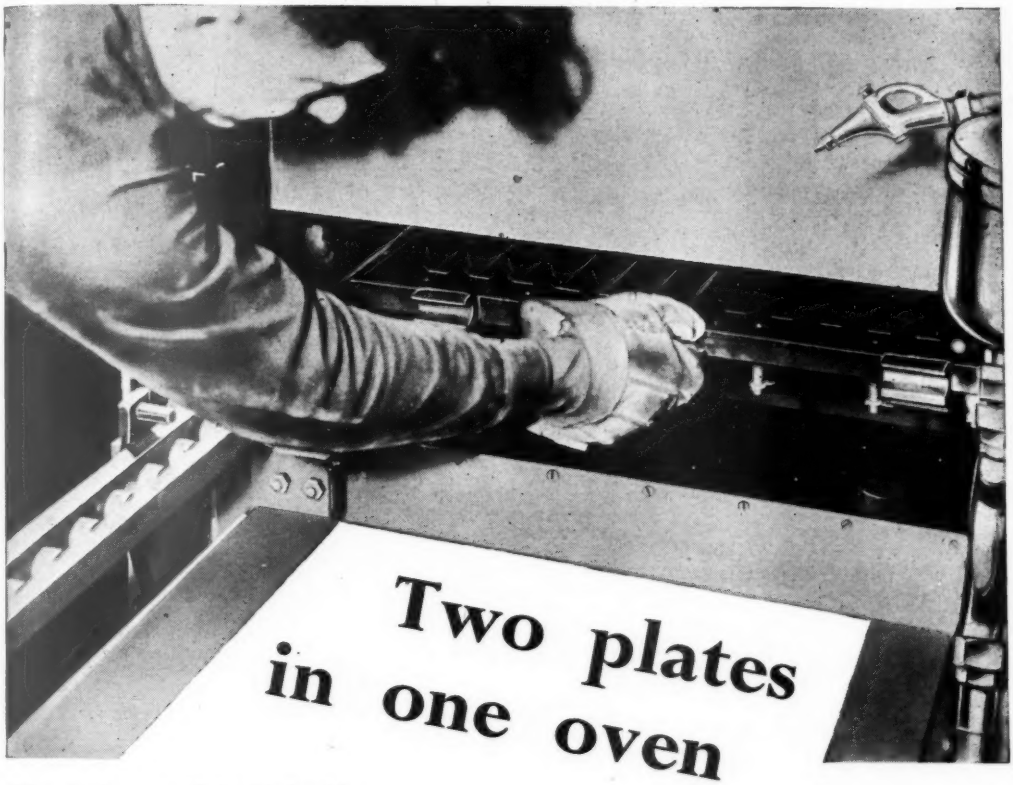
TABLE III.—*Production of New Non-alloy and Alloy Finished Steel.*

Product.	1952.[4]	1953.	1953.	1954.	
			Mar.	Feb.	Mar.
Non-alloy steel:					
Ingots, blooms, billets and slabs[5]	4.5	4.7	5.4	5.3	5.3
Heavy rails ..	8.0	8.7	8.6	11.6	10.7
Sleepers, fishplates, etc.	1.8	2.2	2.1	1.8	2.9
Plates, ¼ in. thick and over ..	41.4	46.5	45.8	51.8	49.7
Other heavy prod.	39.0	43.9	42.8	47.7	48.4
Rods, bars in coil	15.9	15.6	16.5	18.6	18.3
Light rolled prod. ..	46.0	49.3	52.5	47.5	46.0
Bright steel bars ..	6.5	6.7	7.6	6.3	6.3
Hot rolled strip ..	18.8	18.8	20.7	21.0	23.0
Cold rolled strip ..	6.1	5 2	4.9	7.0	6.9
Sheets, incl coated	31.7	34.1	32.3	39.4	40.6
Tinplate, terneplate and blackplate ..	16.0	14.9	13.8	18.0	18.6
Steel tubes, pipes	20.1	20.1	19.8	19.9	20.5
Tube, pipe ftgs.	0.4	0.3	0.3	0.4	0.4
Tyres, wheels, axles	3.5	4.4	4.2	4.8	4.9
Forgings (excl. drop forgings) ..	2.8	3.1	3.3	2.9	2.8
Steel castings ..	4.2	4.0	4.2	4.1	3.8
Tool and magnet steel	0.3	0.3	0.3	0.3	0.3
Total	267.0	282.8	285.1	308.4	309.4
Alloy steel	13.4	13.7	14.8	13.8	13.0
Total deliveries from U.K. prod.[7] ..	280.4	296.5	299.9	322.2	322.4
Add: Imported finished steel ..	12.9	6.8	6.2	9.0	8.1
Deduct: Intra-Industry conversion[8] ..	42.7	42.6	45.2	42.4	41.5
Total deliveries of new material ..	250.6	260.7	260.9	288.8	289.0

TABLE IV.—*Production of Pig-iron and Ferro-alloys*

District.	Furnaces in blast.	Hematite.	Basic.	Foundry.	Forge.	Ferro-alloys.	Total.
Derby, Leics., Notts., Northants and Essex	26	—	17.3	25.6	1.2	—	44.2
Lancs. (excl. N.W. Coast), Denbigh, Flints. and Cheshire ..	8	—	16.5	—	—	1.3	17.8
Yorkshire (incl. Sheffield, excl. N.E. Coast) ..							
Lincolnshire ..	11	—	32.7	—	—	—	32.7
North-East Coast	26	4.4	51.7	—	—	1.2	57.3
Scotland	9	0.8	15.7	1.9	—	—	18.4
Staffs., Shrops., Worcs., and Warwick ..	8	—	5.7	1.6	—	—	7.3
S. Wales and Monmouthshire ..	9	4.9	31.5	—	—	—	36.4
North-West Coast	8	16.7	—	0.1	—	1.2	18.0
Total ..	105	26.8	171.1	29.2	1.2	3.7	232.1†
March, 1954[8] ..	105	27.6	168.5	30.4	0.6	3.8	230.9
April, 1953 ..	103	24.8	154.9	28.6	1.4	3.0	212.7

[1] Weekly average of calendar month.
[2] Stocks at the end of the years and months.
[3] Average 53 weeks ended January 3, 1953, all tables.
[4] Five weeks, all tables.
[5] Other than for conversion into any other form of finished steel listed
[6] Includes finished steel produced in the U.K. from imported ingots and semi-finished steel.
[7] Material for conversion into other products also listed in this table.
[8] Including 100 tons direct castings.



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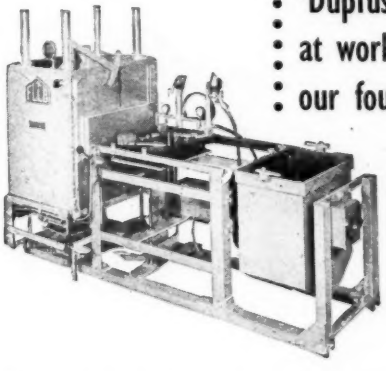

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Raw Material Markets

Iron and Steel

Although overall outputs of pig-iron are the highest ever recorded, the annual rate of production now being obtained exceeding 12,000,000 tons, the foundry trades have benefited but little from the improved supply position; in fact, some sections are finding it extremely difficult to acquire the pig-iron most suitable for their requirements. This applies particularly to the engineering and speciality foundries, whose production calls for larger tonnages of the low- and medium-phosphorus irons than can be obtained. Stocks at producing furnaces and at the foundries are practically non-existent, and reliance has therefore to be placed on current outputs, which in many instances is the cause of much delay in delivery because of the varied analyses which the furnaces are called upon to produce.

Failing to obtain sufficient quantities of the low- and medium-phosphorus irons, the engineering foundries have to depend on securing supplies of both hematite and the refined grades of iron to make good the shortage.

In the case of hematite, the large quantities which are supplied to the steelworks, particularly in some areas, leave only a modest proportion for distribution to the foundries, and these supplies are invariably in the lower silicon ranges, which necessitates the use of ferro-silicon by the foundries to provide the desired silicon content in their mixtures.

The engineering and speciality foundries continue to be fairly well provided with work and any increase in business would be difficult to implement, judging by their present difficulties in securing supplies of pig-iron.

The supply of high-phosphorus pig-iron is about equal to demands, which show little change from the last few weeks, and at present the effects of increased prices of raw materials cannot be fully ascertained. Competition for orders which arise is still severe, and in some instances recent increases have had to be absorbed to obtain business. Forward bookings for the light and some of the jobbing foundries are scarce; orders on hand are readily completed and some sections of the light-casting trade, particularly those producing castings for domestic utensils, are very short of work.

In the supply of semis, the British steel industry has now reached the stage of self-sufficiency. Imports from Belgium, France, and Luxembourg have been reduced almost to vanishing point, and now that the bar re-rollers are catching the trade winds, there is no reason to suppose that their billet requirements cannot be adequately met from home sources of supply.

British steelmakers experience no difficulty in providing the large tonnages of bars and slabs required to sustain the high outputs of the sheet mills. The demand for plates below $\frac{1}{4}$ in. is exceptional, and there is a continued call for sections and joists.

Non-ferrous Metals

Ever since the London copper market opened there has been a good deal of criticism of the presentation of the price. In the opinion of many people, the daily valuation of electro, as represented by the standard copper settlement price, has been a long way apart from the world value of the metal. Representations having been made to the committee, a prolonged study has been made of the situation to try to evolve a c.i.f. electro wire-bar contract which would provide what was required. In many directions hopes ran high that this would be achieved, and therefore the statement made by the chairman of the committee that, due to many practical difficulties, this step was at the present time not possible came as a big disappointment.

However, the question is to be kept under review, and should the situation develop favourably, it can hardly be doubted that the matter will be raised again. In the meanwhile, consideration is to be given to the standard contract with a view to considering whether any changes are desirable. There is, of course, a fair body of opinion which feels that the market has, on the whole, given a good account of itself during the 11 months it has been in operation and counsels caution in doing anything to change the present set-up.

Almost up to zero-hour—midnight on June 30—signatures were being appended to the International Tin Agreement, but a couple of days or so before the end of the month it was certain that the scheme would be approved as a majority of the votes had been secured.

All the producing countries signed as it was expected that they would, but the final result was actually in doubt till close on time. This event is hailed as a bull point for tin and the market made a good showing last week, but it was not until Indonesia and Siam signed that the bulls felt really happy. A feature of the market was the widening of the backwardation, which finished at £7 last Friday afternoon, when at the close of business cash was up £16 and three months £11.

Tin was the only outstanding metal, for the others showed little change. In copper the backwardation increased to nearly £3, cash registering a gain of 25s. and three months of 7s. 6d. In the United States the suspension of the import duty has been extended for a further 12 months. Zinc lost 2s. 6d. and 5s., while in lead July metal was cheaper by 10s. and October unchanged.

Official metal prices were as follow:—

COPPER, Standard—*Cash:* July 1, £239 10s. to £239 15s.; July 2, £240 to £240 10s.; July 5, £240 5s. to £240 10s.; July 6, £240 to £240 5s.; July 7, £239 10s. to £240.

Three Months: July 1, £237 to £237 5s.; July 2, £237 5s. to £237 10s.; July 5, £237 5s. to £237 10s.; July 6, £237 5s. to £237 10s.; July 7, £237 5s. to £237 7s. 6d.

TIN, Standard—*Cash:* July 1, £755 to £756; July 2, £752 to £754; July 5, £754 to £756; July 6, £756 to £758; July 7, £761 to £763.

Three Months: July 1, £747 10s. to £748; July 2, £745 10s. to £746 10s.; July 5, £745 to £745 10s.; July 6, £746 to £747; July 7, £749 to £750.

ZINC—*July:* July 1, £78 to £78 5s.; July 2, £78 7s. 6d. to £78 10s.; July 5, £78 10s. to £78 12s. 6d.; July 6, £78 12s. 6d. to £78 15s.; July 7, £78 10s. to £78 15s.

First half October: July 1, £79 to £79 2s. 6d.; July 2, £79 2s. 6d. to £79 5s.; July 5, £79 2s. 6d. to £79 5s.; July 6, £79 2s. 6d. to £79 5s.; July 7, £79 to £79 5s.

LEAD—*First half July:* July 1, £96 5s. to £96 15s.; July 2, £96 10s. to £96 15s.; July 5, £96 10s. to £96 15s.; July 6, £96 10s. to £96 15s.; July 7, £96 15s. to £97.

First half October: July 1, £94 5s. to £94 15s.; July 2, £94 5s. to £94 15s.; July 5, £94 10s. to £94 15s.; July 6, £94 10s. to £94 15s.; July 7, £94 15s. to £95.

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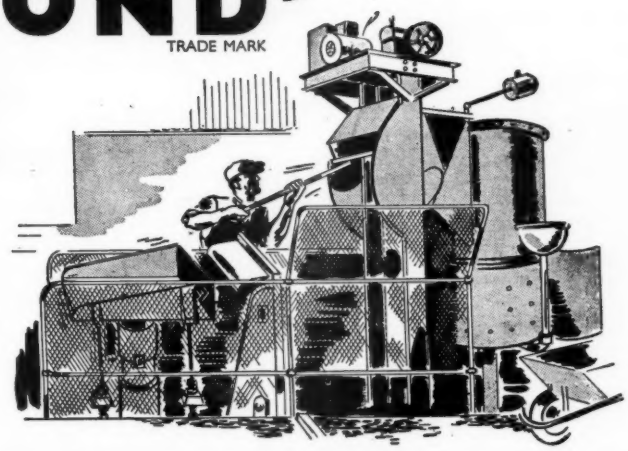

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Current Prices of Iron, Steel, and Non-ferrous Metals

(*Delivered unless otherwise stated*)

July 7, 1954

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2:—Middlesbrough, £14 19s. 6d.; Birmingham, £14 12s. 9d.

Low-phosphorus Iron.—Over 0.10 to 0.75 per cent. P, £17 5s. 9d., delivered Birmingham. Staffordshire blast-furnace low-phosphorus foundry iron (0.10 to 0.50 per cent. P, up to 3 per cent. Si), d/d within 60 miles of Stafford, £17 16s. 9d.

Scotch Iron.—No. 3 foundry, £17 9s. 6d., d/d Grangemouth.

Cylinder and Refined Irons.—North Zone, £18 19s. 6d.; South Zone, £19 2s. 0d.

Refined Malleable.—P, 0.10 per cent. max.—North Zone, £19 19s. 6d.; South Zone, £20 2s. 0d.

Hematite.—Si up to 2 per cent., S. & P. over 0.03 to 0.05 per cent.:—N.-E. of England (local iron), £17 14s. 6d.; Scotland (Scotch iron), £18 1s. 0d.; Sheffield, £18 19s. 0d.; Birmingham, £19 6s. 6d.; Wales (Welsh iron), £18 1s. 0d.

Basic Pig-iron.—£15 10s. 6d. all districts.

FERRO-ALLOYS

(*Per ton unless otherwise stated, delivered*)

Ferro-silicon (6-ton lots).—40/55 per cent., £50 0s. 0d., basis 45 per cent. Si, scale 21s. per unit; 70/84 per cent., £78 10s. 0d., basis 75 per cent. Si, scale 22s. per unit.

Ferro-vanadium.—50/60 per cent., 23s. 8d. to 25s. 0d. per lb. of V.

Ferro-molybdenum.—65/75 per cent., carbon-free, 10s. 0d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., carbon-free, £150 0s. 0d. to £165 0s. 0d. per ton; 38/40 per cent., £239 0s. 0d. to £250 0s. 0d. per ton.

Ferro-tungsten.—80/85 per cent., 11s. 11d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 14s. 11d. per lb. of W.

Ferro-chrome (6-ton lots).—4/6 per cent. C, £85 4s. 0d., basis 60 per cent. Cr, scale 28s. 3d. per unit; over 6 per cent. C, £80 17s. 0d., basis 60 per cent. Cr, scale 26s. 9d. per unit; max. 2 per cent. C, 2s. 0½d. per lb. Cr; max. 1 per cent. C, 2s. 1d. per lb. Cr; max. 0.15 per cent. C, 2s. 2d. per lb. Cr; max. 0.10 per cent. C, 2s. 2¼d. per lb. Cr; max. 0.06 per cent. C, 2s. 2½d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 6s. 3d. to 6s. 9d. per lb.

Metallic Manganese.—93/95 per cent., carbon-free, £225 0s. 0d. to £232 0s. 0d. per ton; 96/98 per cent., £255 0s. 0d. to £262 0s. 0d. per ton.

Ferro-columbium.—60/75 per cent., Nb + Ta, 52s. 6d. to 70s. 0d. per lb., Nb + Ta.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft, u.t., £25 12s. 6d.; tested, 0.08 to 0.25 per cent. C, £26 12s. 0d.; hard (0.41 to 0.60 per cent. C), £28 0s. 0d.; silico-manganese, £33 16s. 0d.; free-cutting, £28 16s. 6d. SIEMENS MARTIN ACID: Up to 0.25 per cent. C, £32 12s. 0d.; silico-manganese, £34 17s. 6d.

Billets, Blooms, and Slabs for Forging and Stamping.—Basic, soft, up to 0.25 per cent. C, £29 16s. 0d.; basic, hard, over 0.41 up to 0.60 per cent. C, £30 16s. 0d.; acid, up to 0.25 per cent. C, £33 0s. 0d.

FINISHED STEEL

Heavy Plates and Sections.—Ship plates (N.-E. Coast), £31 1s. 6d.; boiler plates (N.-E. Coast), £32 9s. 0d.; floor plates (N.-E. Coast), £32 10s. 6d.; sectional material, N.-E. Coast, £29 4s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., untested, £32 7s. 0d.; flats, 5 in. wide and under, £32 7s. 0d.; hoop and strip, £33 9s. 0d.; black sheets, 17/20 g., £42 1s. 0d.; galvanized corrugated sheets, 24 g., £51 8s. 6d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £53 8s. 0d.; nickel-chrome, £75 2s. 0d.; nickel-chrome-molybdenum, £84 13s. 6d.

NON-FERROUS METALS

Copper.—Cash, £239 10s. 0d. to £240 0s. 0d.; three months, £237 5s. 0d. to £237 7s. 6d.; settlement, £240 0s. 0d.

Copper Tubes, etc.—Solid-drawn tubes, 27⅞d. per lb.; wire, 268s. 9d. per cwt. basis; 20 s.w.g., 300s. 0d. per cwt.

Tin.—Cash, £761 0s. 0d. to £763 0s. 0d.; three months, £749 0s. 0d. to £750 0s. 0d.; settlement, £763 0s. 0d.

Zinc.—July, £78 10s. 0d. to £78 15s. 0d.; first half October, £79 0s. 0d. to £79 5s. 0d.

Zinc Sheets, etc.—Sheets, 15 g. and thicker, all English destinations, £108 17s. 6d.: rolled zinc (boiler plates), all English destinations, £106 12s. 6d.; zinc oxide (Red Seal), d/d buyers premises, £96 0s. 0d.

Lead (Refined Pig).—First half July, £96 15s. 0d. to £97 0s. 0d.; first half October, £94 15s. 0d. to £95 0s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 22⅞d. per lb.; rods, drawn, 32¼d.; sheets to 10 w.g., 259s. 3d. per cwt.; wire, 30¼d.; rolled metal, 245s. 6d. per cwt.

Brass (Brazing).—BS1400, B3 (65/35), £164; B6 (85/15), — ; BS249, £174.

Brass (High Tensile).—BS1400, HTB1 (30 tons), £205; HTB2 (38 tons), £210; HTB3 (48 tons), £220.

Gunmetal.—RCH, 3/4 per cent. tin, — ; BS1400, LG2 (85/5/5/5), £197; LG3 (86/7/5/2), £206; G1 (88/10/2/½), £277; (88/10/2/1), £268.

Phosphor Bronze.—BS1400, PB1 (AID released), £289 per ton.

Phosphor Bronze Strip, etc.—Strip, 366s. 0d. per cwt.; sheets to 10 w.g., 388s. 6d. per cwt.; wire, 45½d. per lb.; rods, 39¾d.; tubes, 38d.; chill cast bars: solids 40½d., cored 41½d. (CHARLES CLIFFORD, LIMITED.)

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 3s. 1¾d. per lb.; round wire, 10g., in coils (10 per cent.), 3s. 7d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 3s. 6d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 6d. per lb. Antimony, English, 99 per cent., £210 0s. 0d. Quicksilver, ex warehouse, £97 10s. 0d. Nickel, £483 0s. 0d. Aluminium, ingots, £156 0s. 0d.; aluminium bronze (BS1400), AB1, £248; AB2, £259. Solder, brazing, BS1845, 1s. 11d. lb.; granulated, 2s. 2d. lb.

Costly Accidents

This week's leading article reviewing the Report of the Chief Inspector of Factories deals with phases of accident occurrence and prevention chiefly from a humanitarian aspect. Not only, however, are accidents costly in life and limb and lost time, as the following reports show:—

£2,250 for Lost Eye

Damages were awarded against the English Steel Corporation, Limited, Sheffield, at Leeds Assizes on June 30, amounting to £2,250 to Mr. A. Thompson of Sheffield, who sued for negligence. Thompson, a machinist, was tapping steel packing pieces with a hammer on July 11, 1950, when a chip of metal flew into his eye. He lost the sight of the eye.

Lifting Accident—£500

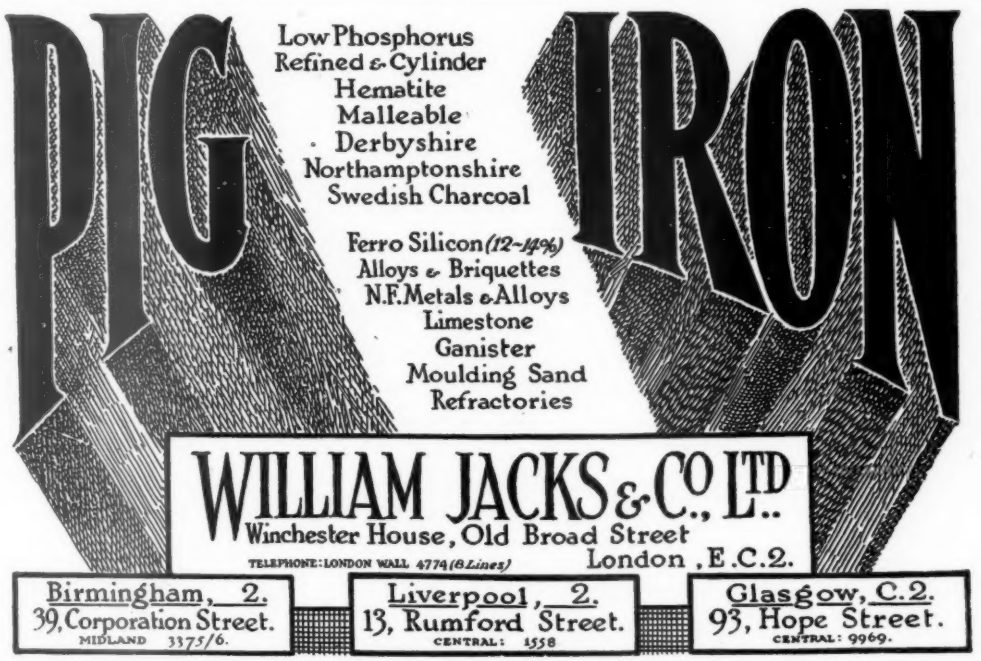
A Falkirk moulder who strained his chest when lifting a moulding box was recently awarded £500 damages by a Court of Session jury sitting with Lord Migdale. The man, Andrew Wilson, sued his employers, the Forth & Clyde & Sunnyside Iron Companies, Limited, Camelon, for £1,500. Wilson said that in the course of his work he had to lift a large moulding box with the assistance of another workman. No lifting tackle or other assistance was provided, and he maintained that his employers failed in their duty to provide suitable plant. The firm, who denied liability, said the box was so designed to be lifted by two men and was of such size and weight that it could be lifted without risk of injury.

£2,750 Award for Coke-oven Worker

James Clancy, coke-oven worker of Glasgow, has been awarded £2,750 damages by a jury sitting with Lord Patrick in the Court of Session, against Dixon's Ironworks, Limited, Crown Street, Glasgow, for injuries he sustained in their employment. Clancy said that on August 22, 1952, he was working at a tipper used for transferring coal or coke from railway wagons into hoppers. A large lump of caked coal-dust, weighing about two tons, fell on his right leg with the result that he had been advised that he would never be fit for anything but light work. He alleged that his employers had failed to take reasonable care for the safety of their workmen. The defenders said that Clancy had been employed in this work for ten years and was fully experienced in it. Unnecessarily, and contrary to instructions, he stood in the path of the load.

£1,000 Dermatitis Claim Succeeds

Damages of £1,000 have been awarded in the Court of Session by a jury sitting with Lord Strachan, to a Paisley man who sued his former employers, Harland & Wolff, Limited, Govan Shipbuilding Works, Glasgow, for £1,500, claiming that he contracted dermatitis because of their negligence. The pursuer, Thomas Sproul, was employed by defenders as a furnaceman, and his duties were to clean metal castings by blasting them with compressed air. Sproul said that suits and gauntlets were badly torn and burned, and afforded little protection against sand, dirt, ashes, and bits of metal blown about by the compressed air. It was notorious that such conditions were productive of dermatitis and other industrial diseases. He alleged that the defenders had failed to provide a safe system of work. The defenders, who denied liability, said that the chamber on which the blasting was conducted was adequately ventilated and that the pursuer was provided with special protective clothing which was renewed as necessary. The jury were unanimous.



NOTICE

Replies to Box Numbers to be addressed to "Foundry Trade Journal," 49, Wellington Street, London, W.C.2.

SITUATIONS WANTED

FOUNDRY MANAGER (40) seeks situation. 25 years' experience in grey and special iron casting production of both a repetition and jobbing character up to 10 tons. Accustomed to working for competitive markets, and being directly responsible to Board, having served 15 years in executive and administrative capacities. Up to date in modern materials and plant developments, shell moulding, materials handling, and foundry layouts. Salary required £2,000 p.a.—Box FM613, FOUNDRY TRADE JOURNAL.

FOUNDRY RESINS. — Practical technical man in all branches foundry synthetic resin applications desires appointment as TECHNICAL SALES MANAGER for Foundry Resins and/or equipment in connection therewith. Excellent contacts, commercial and technical, both in United Kingdom and European countries.—Box FR632, FOUNDRY TRADE JOURNAL.

DIE FOUNDRY FOREMAN (Gravity). 30 years' experience. Capable of controlling large staff.—Box DF626, FOUNDRY TRADE JOURNAL.

FOUNDRY MANAGER desires change. Experienced in mechanised and jobbing foundries. Buying and Sales experience, with prospect of introducing new business. Midland area. Further details on application to Box FM631, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 *inclusive or a woman aged* 18-59 *inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order,* 1952.

FOUNDRY FOREMAN, with extensive experience mechanised production, labour control, etc., required for Malleable Foundry in Midlands. Applications should state full details of experience, qualifications and salary required.—Box FF595, FOUNDRY TRADE JOURNAL.

FOUNDRY MANAGER required for Derbyshire Foundry, at present producing 20 tons per week of Engineers' Castings. Must be capable of taking complete charge. Moulding experience essential. Salary will be payable on capability. —Please write, giving experience, qualifications and salary expected, to Box FM620, FOUNDRY TRADE JOURNAL.

SALES OFFICE ESTIMATOR required for Steelfoundry.—Apply in writing, giving full details of experience, etc., Box SO621, FOUNDRY TRADE JOURNAL.

PROGRESSIVE Manufacturing Company in Lancashire requires a TECHNICAL SALES REPRESENTATIVE, with a good knowledge of the application of synthetic resins in industry generally, and in the foundry trade in particular. The successful applicant should preferably be resident in the Manchester area, and own a car.—Apply in strict confidence, giving age, details of experience, salary required, etc., to Box PM623, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—*contd.*

DRAUGHTSMAN, experienced in mechanical detailing in development work, required by Weybridge Consultants. Light structural knowledge an advantage. —Write Box DE622, FOUNDRY TRADE JOURNAL, giving details of experience, age, and salary required.

GRAVITY DIE CASTING FOREMAN or SUPERINTENDENT required. This is an excellent progressive position for capable man who can improve output and quality. Good wages and bonus. Midlands area.—Box GD625, FOUNDRY TRADE JOURNAL.

WORKING CHARGE HAND required for small Non-ferrous Section. Excellent opportunity for advancement, top rates and bonus.—Apply WORKS MANAGER, Crown Foundry Co., Ltd., Far Cotton, Northampton.

MELTING SHOP FOREMAN required for Steel Foundry producing high alloy steels. Wide experience on small Arc Furnaces essential, and some knowledge of H/F. melting would be an advantage. Permanent, progressive position, with housing accommodation if required.—Write, stating age, experience, and salary required, to PERSONNEL OFFICER, Sheepbridge Alloy Castings, Ltd., Hamilton Road, Sutton-in-Ashfield, Notts.

MECHANIC required, with experience of "B.M.M." moulding machines, to service an installation of 32 Turnover and Straight draw type machines in a South African Foundry.—Replies to Box MR614, FOUNDRY TRADE JOURNAL.

FOREMAN/MANAGER required for Light Grey Iron Foundry, to take charge of Cupola and Moulding Shop. Black Country area. Give details of experience and salary required. All replies treated in strict confidence.—Box FM615, FOUNDRY TRADE JOURNAL.

GRAVITY DIE FOUNDRY (Aluminium) in Midlands requires SHOP MANAGER. Must be practical man capable of taking full charge of labour and production; age 30/40. Four-figure salary for the right man.—Box GD616, FOUNDRY TRADE JOURNAL.

MANAGER required for small Non-ferrous Foundry in Birmingham. Knowledge of Gravity Diecasting would be helpful. 5-day week. Staff position. Superannuation Scheme.—Apply, stating age, experience, and salary required, to Box MR617, FOUNDRY TRADE JOURNAL.

A MIDLAND Mechanised Malleable Foundry requires PRODUCTION/METHODS ENGINEER. High salary offered for the right man. Superannuation scheme in operation.—Write, stating experience and salary required, Box AM618, FOUNDRY TRADE JOURNAL.

FIRST-CLASS skilled PATTERNMAKER required. Experienced in wood and metal. Average wages of 44-hour week between £10 and £11.—Apply WELLWORTHY, LTD., Lymington, Hants.

A TECHNICAL SALES REPRESENTATIVE required for the sale and servicing of Shell Moulding Equipment. Should have a pleasant Sales personality and a good foundry background, preferably with Shell Moulding experience. Preference given to active I.B.F. member. Please state in confidence in first letter fullest history, age, etc., and territory preferred.—Box AT619, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—*contd.*

ASSISTANT MANAGER. Must have held responsible position in small non-ferrous foundry, had experience of most metals, and served time moulding. Knowledge of oil furnaces an advantage. Ability to start shell-moulding on small scale desirable. Absolute integrity vital, gaining access to unusual opportunity. South Yorkshire. Men with iron or large non-ferrous foundry experience only, not considered.—Box A.M.544, FOUNDRY TRADE JOURNAL.

DRAUGHTSMAN required for development of specialised Foundry equipment. Opportunity to see each job through assembly, test, and installation stages. Would suit young man with adaptable qualities, after engineering apprenticeship and military service. Drawing ability essential. National Certificate desirable.—MIDLAND MOTOR CYLINDER CO., LTD., Dartmouth Road, Smethwick, Staffs.

FOUNDRY CHARGE-HAND required, central London. Must be experienced in making iron or non-ferrous castings. Good control and initiative essential. Salary £676 p.a., plus overtime. Superannuation after trial period with company.—Write Box FC597, FOUNDRY TRADE JOURNAL.

APPLICATIONS are invited from men of good organising ability, preferably between 30 and 40, for a vacancy on the secretarial staff of the Institute of British Foundrymen. Duties include secretarial work for technical committees and technical editorial work. Considerable travelling involved. Exacting standards of work required, but remuneration good, with excellent pension scheme.—Particulars of age, education, experience and salary required, to be sent to the SECRETARY, St. John Street Chambers, Deansgate, Manchester, 3.

UNIVERSAL MILLERS for Birmingham and Manchester. First-class men, used to high-class work to dead-on limits. Excellent conditions and highest possible remuneration. Particularly accustomed to handling latest and largest Huron, Cincinnati and similar universal milling machines.—Write full particulars of experience to WRIGHT & PLATT, LTD., the world's largest engineering master patternmakers, Irving Street, Birmingham, 15.

PATTERNMAKERS, experienced in both wood and metal, wanted in Birmingham and Manchester by the world's largest engineering master patternmakers. Must be accustomed to highest standards and accuracy, and prepared to work overtime. Ideal conditions, top remuneration.—Write full particulars of experience to Head Office, WRIGHT & PLATT, LTD., Irving Street, Birmingham, 15.

YOUNG ASSISTANT PHYSICAL METALLURGIST wanted for Glasgow engineering works laboratory.—Apply, stating age, full details of qualifications, previous experience and salary required, to Box YA591, FOUNDRY TRADE JOURNAL.

WANTED.—CUPOLA MAN, accustomed to taking full charge and responsibility in Jobbing Foundry situated in Welsh country district. 5 tons maximum.—Write Box WC588, FOUNDRY TRADE JOURNAL.

FOUNDRY MANAGER required for Malleable Iron Foundry in Home Counties. Age 33 to 45. Salary £1,000, and pension scheme. House with garage available at nominal rent.—Apply, giving full history of education, posts held, technical and managerial experience, to Box FM609, FOUNDRY TRADE JOURNAL.